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Occasional Paper

The Dynamics of Labour Market State and Benefit Receipt

An Application Using the 1994–1997 Survey of Employment and Unemployment Patterns

New Issue

Occasional paper

The Dynamics of Labour Market State and Benefit Receipt

An Application Using the 1994–1997 Survey of Employment and Unemployment Patterns

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This occasional paper is intended to make the results of current research available to other interested parties.

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INQUIRIES

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  For information about the Survey of Employment and Unemployment Patterns, contact Harry Kroon on Canberra 02 6252 6753.

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PREFACE

This occasional paper has been written by Guyonne Kalb of the Department of Economics and Business Statistics, Monash University under the auspices of the Survey of Employment and Unemployment Patterns Research Fellowship scheme. This scheme has been established to facilitate high quality analysis of the survey data by researchers who have experience in the analysis of longitudinal data and an in-depth understanding of labour market issues and operations.

In examining the transitions of people between different labour market states and on and off government benefits, this paper identifies the characteristics that have an effect on labour market state and benefit receipt. Modelling techniques are then used to assess who is at risk of long unemployment spells, the effect of benefit receipt on the duration of unemployment and the factors that contribute to job churning.

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LIST OF ABBREVIATIONS AND OTHER USAGES

ABS	Australian Bureau of Statistics
ALS	Australian Longitudinal Survey
DEETYA	Department of Employment, Education, Training and Youth Affairs
DSS	Department of Social Security
SEUP	Survey of Employment and Unemployment Patterns
. .	not applicable
n.a.	figure not available
PRG	Population Reference Group

INFORMATION AVAILABLE ON REQUEST

The following tables of estimated transition models, referred to in this paper, are available on request from the author or can be found on the internet at http:\www.abs.gov.au.

- Bivariate probit model of female labour force participation and benefit receipt for the Population Reference Group
- Bivariate probit model of female self-employment and benefit receipt for the Population Reference Group
- Multinomial logit model of female unemployment, part-time and full-time work for the Population Reference Group
- Bivariate probit model of female unemployment and benefit receipt for the Population Reference Group
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- Bivariate probit model of male self-employment and benefit receipt for Jobseekers
- Multinomial logit model of male unemployment, part-time and full-time work for Jobseekers
- Bivariate probit model of male unemployment and benefit receipt for Jobseekers

SYNOPSIS

Longitudinal research on Australian labour market behaviour in general and unemployment issues in particular, has been made possible by the release of the Survey of Employment and Unemployment Patterns (SEUP). The aim of this study is to make use of the longitudinal aspect of the data to explore the mobility of people between different labour market states, and on and off government benefits.

Data for the SEUP covers the three year period—September 1994 to September 1997, and was collected in three waves in 1995, 1996 and 1997. In the SEUP there were three groups of interest—Jobseekers, Labour Market Program participants and a Population Reference Group. This study analyses the Jobseeker group and, for the purposes of comparison, the Population Reference Group. Because administrative data covering the last wave of the survey was not available at the time, most of the analysis in this paper is limited to the first two years of the survey.

In this study the following labour market issues were addressed—

What characteristics, for males and females, are associated with labour market state and benefit receipt?

A three stage decision process was used to categorise respondents into one of five labour market states: out of the labour force; unemployed; working full-time; working part-time; and self-employed.

Models were then developed to analyse the probability of being in different labour market states at September 1996 (i.e. the current period). In these models one of the explanatory variables used was labour market state at September 1995 (the previous period).

Similar models were used to analyse the probability of receiving a particular type of benefit in the current period. Again benefit receipt at the end of the previous period was one of the explanatory variables used.

Results from these models were very wide ranging and are as follows:

- For both males and females, labour market state and benefit receipt in the previous period are the most important factors influencing the current labour market state and benefit receipt. That is, people are most likely to remain in the same situation.
- For both groups, benefit receipt and unemployment are strongly and positively correlated, as one would expect. There is also some evidence of a small positive correlation between benefit receipt and being absent from the labour force, but it is much weaker, especially for females.
- There is evidence of a discouraged worker effect, in that the results show that females from both groups and male Jobseekers who were previously unemployed were more likely to be absent from the labour force in the current period.

- The effect of benefits on labour market state is varied. Females from the Population Reference Group who were unemployed and who received benefits in the previous period, seemed no more likely to be out of the labour force in the current period than other females. A similar effect is observed for male Jobseekers. Also females were less likely to enter employment in the current period if their spouse received benefits in the previous period, however the spouse's benefit receipt did not increase the probability of them leaving employment.
- Male and female Jobseekers who were out of the labour force and received benefits in the previous period are more likely to continue receiving benefits in the current period than Jobseekers who were working and receiving benefits in the previous period.
- Previous work history had a strong bearing on people's labour market state. Males and females from both the Jobseeker and Population Reference Group who were previously out of the labour force, unemployed, or receiving benefits were less likely to be working part-time or full-time in the current period and more likely to be unemployed. Similarly, a larger number of years of previous work experience decreased the likelihood of unemployment for males and females. It also increased the likelihood of full-time work for males and part-time work for females in the current period.
- Among male Jobseekers, previous part-time employment decreased the likelihood of working full-time in the current period. Also male Jobseekers who were previously unemployed or who migrated after 1984 are more likely than other male Jobseekers to be self-employed in the current period. This tends to support theories that unemployed males who have difficulties finding work often attempt moving into self-employment as a means of escaping unemployment.
- As expected, the presence of young children and lower levels of educational attainment increased the likelihood of females being out of the labour force. A decrease in the spouse's labour supply over the past year increased the likelihood of males being out of the labour force.
- Males from a non-English speaking background are more likely to work full-time and less likely to be unemployed in the current period than other males provided that their proficiency in English is at least good, otherwise they are less likely to work full-time or part-time.
- Males whose spouse is out of the labour force are less likely than other males to work part-time.
- Males, who received benefits and who were unemployed in the previous period, are more likely to work part-time than males who only received benefits or males who were only unemployed. The latter may be an indication that there is an incentive to take up part-time work for people who are unemployed and receive benefits. Also male Jobseekers who received benefits in the previous period and worked part-time are more likely to remain in part-time work than other male Jobseekers.

Who is at risk of long unemployment spells?

To answer this question, a duration model was estimated using all the spells of unemployment in the two-year period from September 1994 to September 1996.

From the results for the Population Reference Group it can be seen that longer unemployment spells are to be expected for older people, those whose speaking proficiency in English is less than good, females with young children, those who have been looking for work for a larger number of years, and those whose spouse is unemployed. Shorter unemployment spells are to be expected for people who received training in the previous period, those with a reading proficiency in English that is less than good, those living in urban centres outside the capital cities, and those with higher business and property income.

For Jobseekers, longer spells can be expected for males, females with young children, those who have a handicap that impedes employment, older people, those from a non-English speaking background, or of Aboriginal or Torres Strait Islander origin, those with a longer duration of previous unemployment and looking-for-work spells, and those whose spouse is out of the labour force or working part-time. Shorter spells are expected for people with higher education levels, those who received training in the previous period, those with a larger number of previous unemployment spells in the two-year survey period, those with more work experience, and those living in rural areas.

In neither of the two groups is there any evidence of duration dependence within the unemployment spell. This means that the probability of exit from unemployment is constant over the duration of unemployment within the two year observation period, conditional on other characteristics. Although this finding is similar to that observed by Chapman and Smith (1993) for young Australians, it is contrary to some other Australian results (e.g. Brooks and Volker, 1986) who have found a 'scarring' effect of unemployment. A larger number of explanatory variables, and the inclusion of unobserved heterogeneity in this study could account for these differences. This would mean that the low exit rates after spending some time in unemployment are explained by the differences in characteristics of unemployed people rather than by the fact that they have been unemployed for a while. That is, the probability of exit of these long-term unemployed already was low at the start of unemployment.

Did benefit receipt and the changes in July 1995 to social security benefits have any effect on the duration of unemployment?

For Jobseekers, benefit receipt in general seems to lengthen unemployment spells more than unemployment benefits do. Compared to Jobseekers who did not receive benefits, those who received benefits had unemployment spells that were, on average, over three times longer, whereas those who received unemployment benefits had spells that were only twice as long.

In assessing the impact of the July 1995 changes, account was taken of the general improvement in the labour market situation during the course of the survey. For example, unemployment rates fell from around 9.3 to 8.5 per cent between September 1994 and September 1997.

For benefit recipients from the Jobseeker group, unemployment durations declined considerably after 1 July 1995 (by 68%). However, unemployment benefit recipients and those who received no benefits experienced more modest declines in unemployment duration of about 28 and 29% respectively.

Which characteristics are relevant in determining the duration of the first employment spell after unemployment?

To answer this question, a duration model was estimated including all the first spells of employment occurring after an episode of unemployment in the two-year period from September 1994 to September 1996. Similar variables to those in the unemployment spell analysis were used to make a comparison of the effects of characteristics on both employment and unemployment duration possible.

The results for the Population Reference Group show employment spells are longest for people of about 32 years old. Shorter spells are to be expected for people who have a handicap that impedes employment, single people, those who receive benefits and those with an unemployed spouse. There is also evidence of negative duration dependence, which means that the probability of exiting from employment gets lower as the employment spell gets longer.

For Jobseekers, the longest employment spells are expected for people of about 36 years old. Longer spells are expected for people from a non-English speaking background, those with more recent work experience, those with higher income from business and property, those who receive benefits, those whose partner works part-time, the self-employed and those in employment spells after 1 July 1995. This last result is probably an effect of the recruitment process for Jobseekers where, because the majority of Jobseekers were unemployed at recruitment, employment spells prior to recruitment (i.e. prior to May 1995) would tend to be shorter.

Among Jobseekers, shorter spells are anticipated for males, those with a handicap that impedes employment, those who had a larger number of recent unemployment spells, those who have been looking for work for a larger number of years since leaving full-time education, those who become employed at a time and in a region where the ratio of vacancies to the number of unemployed is higher, part-time workers and those in receipt of benefits while in employment spells after 1 July 1995.

There is no evidence of negative or positive duration dependence for Jobseekers.

Are there any characteristics that make someone more likely to have both short employment and unemployment spells, resulting in a sequence of employment and unemployment episodes from which it may be difficult to escape?

By comparing common findings from an analysis of persons in the second (unemployed) and the fourth (working part-time) labour market state, characteristics that both shorten employment and unemployment spells can be identified. Only three characteristics were found to have this effect for Jobseekers and no characteristics were found for the Population Reference Group.

Looking at Jobseekers therefore, it seems that having a history of several short unemployment spells makes one more likely to have both short unemployment and short employment spells, so that a past sequence of short employment and unemployment spells is likely to be continued. Second, benefit recipients after 1 July 1995 have shorter employment and unemployment spells as compared to others and as compared to people receiving benefits before 1 July 1995. Finally, those receiving unemployment benefits seem to have shorter spells than other benefit recipients.

It is also interesting to note the groups that are more likely to experience both longer employment and unemployment spells. These are people from a non-English speaking background, people who receive benefits and people with a spouse in part-time work.

This study has made an important first step towards understanding certain questions about labour market state and benefit receipt over time in Australia. It attempts to find the relationships between current and previous labour market state and benefit receipt. However, there are several ways the analyses in this study could be improved. This is left for future research, which could focus on improving model specifications and on studying subgroups within the Australian population.

SECTION 1 INTRODUCTION

Unemployment is seen as a major social and economic problem in Australia with the proportion of long-term unemployed causing particular concern. In January 1994, 339,600 persons were long-term unemployed (that is unemployed more than 52 weeks), which was about 35% of all unemployed. In January 1999, 240,300 persons were long-term unemployed, comprising about 32% of total unemployment. Over time the percentage of long-term unemployed has fluctuated, but has not fallen below 27% of total unemployment in the period between January 1994 and January 1999.[1] Long-term unemployed people are often seen as particularly disadvantaged, since they can be on a low income for extended periods of time without much prospect of improvement. The above figures also do not reveal the problem of people continuously moving in and out of short term jobs.

The aim of this study therefore is to explore the mobility of people between different labour market states, with an emphasis on movements in and out of unemployment. However, the movements between all labour market states and the mobility on and off benefits are also of interest. For example, unemployment can partly be hidden by discouraged workers moving out of the labour force or unemployed people who want to work full-time moving into part-time work.

EXPLORING LABOUR MARKET MOBILITY

In exploring labour market mobility the issues that are addressed are as follows:

- What characteristics for males and females are associated with particular labour market states and benefit receipt?
- Who is at risk of long unemployment spells?
- Is unemployment duration affected by benefit receipt in general and/or by the income support policy changes introduced in July 1995.
- What characteristics are relevant in determining the duration of the first employment spell after unemployment?
- Are there any characteristics that make someone more likely to have both short employment and unemployment spells, resulting in a sequence of employment and unemployment spells from which it may be difficult to escape?

1 These numbers are obtained from the January issues of *Labour Force, Australia* (ABS, 1995, 1996, 1997, 1998 and 1999, Cat. no. 6203.0).

Labour market state and benefit receipt

In this study respondents from the Population Reference Group and the Jobseeker group are categorised into one of five labour market states: out of the labour force; unemployed; working full-time; working part-time; and self-employed. These states are defined for respondents at September 1995 and September 1996.

Data from the Survey of Employment and Unemployment Patterns (SEUP) allow us to determine what characteristics are associated with these states and with benefit receipt.

In determining these characteristics this study goes beyond a cross-sectional analysis of labour market state and benefit receipt by including explanatory variables from an earlier point in time (e.g. labour market state and benefit receipt in the previous period and changes in the spouse's labour supply and income). Due to their different labour market behaviour this analysis is performed separately for males and females.

Determining these characteristics may help policy makers in designing and targeting effective policies. For example, it is often found that people with a lower education level are more likely to become and remain unemployed (see for example, Theeuwes, Kerkhofs and Lindeboom, 1990; Harris, 1996; or Van den Berg and Lindeboom, 1998). Thus, an effective policy might be to provide programs of additional training or education to unemployed people with low education levels.

An analysis such as this has not been possible before, because of a lack of suitable longitudinal data. The Australian Longitudinal Survey (ALS) only covers younger people, which limits its potential for study on the labour market behaviour of the Australian population and unemployed people in general. The SEUP is a longitudinal survey that provides information for the whole working-age population covering the period September 1994 to September 1997.[2]

Unemployment spells

The analyses of labour market state and benefit receipt only examine the data at two discrete points in time. Duration analysis which makes full use of the continuous nature of the data can reveal the characteristics that make people more likely to be unemployed for a long time. It can also estimate whether particular changes have an effect on unemployment duration. This makes it useful for policy makers who want to develop or evaluate new policies and/or target certain groups in order to reduce the duration of unemployment. Research into the duration of unemployment spells in Australia is of particular interest

2 Parts of this study, that make use of information on benefits, only cover a two-year period from September 1994 to September 1996, because the administrative data for the third year from the (former) Department of Social Security were not available at the time of analysis.

because, until now, no data set has been available that would have allowed such a study to be carried out. Although this topic has had little attention in Australia, it has been researched extensively in the international economic literature.

The unemployment duration is analysed by a hazard rate model. This analysis will provide an answer to the second research question of who is at risk of longer unemployment spells. Independent variables that are included are personal characteristics, household composition, geographical location, work history, income variables (including benefit receipt), and the income and labour market situation of the spouse.

The effect of benefit receipt and the July 1995 policy changes

The third labour market issue focuses on the effects of benefit receipt and the policy changes of July 1995 on the unemployment duration.[3] Thus, it is part of the unemployment duration analysis just described.

The effect of benefit payments and benefit rules on re-employment is at the centre of the unemployment debate, with some people advocating a lower level of benefits, more targeted benefits or more stringent eligibility rules. So far, much of the Australian research in relation to this question has used macro-data (for example, Stricker and Sheehan, 1978; Harper, 1980; McMahon and Robinson, 1984; Sheehan and Stricker, 1984; Trivedi and Baker, 1985; Bradbury, 1988; and Fahrer and Pease, 1993), rather than micro-data (Chapman and Smith, 1993).

The July 1995 changes to income support policy were introduced as part of the Working Nation policy package. These changes included a decrease in the maximum benefit withdrawal rate[4] from 100% to 70%, a lower 'free area' for earnings, partial individualisation of benefit payments for couples, and changed eligibility requirements for some partners of unemployed people.

In measuring the impact of these changes the effects that benefit receipt and unemployment benefits had on unemployment duration before July 1995 are compared with the effects they had after July 1995. In particular, the possible effect of a number of key policy changes to the

3 It should be stressed here that benefit receipt and unemployment do not always occur simultaneously. In the definition used in this study, everyone who is not currently working, but who is looking for work is unemployed. Not all those who are unemployed according to this definition will be eligible for benefit payments. Reasons for ineligibility are, for example, income of a partner or spouse, own income from investments, value of own assets or being in the first half year after immigration.

4 The benefit withdrawal rate indicates by how much benefit payments are reduced when other income increases. For example, a benefit withdrawal rate of 70% means that benefits are reduced by 70 cents for each dollar of other income.

The effect of benefit receipt and the July 1995 policy changes continued

income support system, which were introduced on 1 July 1995, is explored. As several changes were introduced at once, it is impossible to separate the effects of all the individual changes. However, the effect of other labour market changes, which may have occurred around the same time and would have affected everyone and not just benefit recipients, can be accounted for by including interaction terms of a dummy variable for benefit recipients and a dummy variable indicating whether the unemployment spell is before or after 1 July 1995. The interaction term indicates the additional effect on unemployment duration of being unemployed after 1 July 1995 for benefit recipients as compared to unemployed people in general. As such, it should indicate the effect of the changes to the benefits rules.

Employment spells

Although unemployment spells have been studied extensively in an international context, fewer studies examine employment duration. Therefore, a contribution of this study is that a first step is taken to include an analysis of the first employment spell after unemployment. People's ability to keep a job (after they have been unemployed) is probably as important in the unemployment debate as their probability of obtaining a job when they are unemployed.

In determining what characteristics influence employment duration, similar independent variables as in the unemployment duration analysis are used, plus two dummy variables to indicate part-time, full-time or self-employment.

Spells of employment and unemployment

By comparing the results from the two separate analyses on unemployment and employment, characteristics that are associated with both short unemployment and employment spells can be identified. People experiencing a sequence of such spells can also be seen as being disadvantaged in the labour market and should be of interest to policy makers.

SCOPE OF THE STUDY

This study examines transitions between being absent from the labour force, unemployed, in part-time work, in full-time work and in self-employment, as well as the durations of unemployment and the first employment episode after unemployment. Because data from the third year of the survey were incomplete at the time of analysis, most analyses in this paper only include the transitions from September 1995 to September 1996 and durations occurring between September 1994 to September 1996.

SCOPE OF THE STUDY
continued

Since this study represents one of the first opportunities to carry out research on labour market transitions of Australians, the scope of this research has been kept fairly general. The analyses include the labour market and benefit receipt transitions of all people who have finished their full-time studies. By analysing the behaviour of a variety of respondents in one model, it is inevitable that this study cannot pay as much attention to details as in a more focused analysis. However, it is hoped that some general patterns will be identified.

At a later stage, research could be tailored towards subgroups, which emerge from these first exploratory analyses as of specific interest. The results of this research can be seen as a first step towards a more detailed study of particular groups, which can perhaps deal more appropriately with some issues than is possible here.

OUTLINE OF THE STUDY

The study is organised as follows: section 2 briefly discusses the underlying economic rationale for the duration models and the methodology used for the analyses in this study. Section 3 describes the data and the variables used in this analysis. It describes the selection criteria for inclusion in the analysis and the creation of the dependent variables. In addition, frequencies and cross tabulations are given for the dependent and independent variables.

The results from the models described in section 2 are reported in the next three sections. Section 4 uses the transition model results to describe what characteristics have the most impact on benefit receipt and labour market state. Sections 5 and 6 examine the duration of unemployment and employment spells respectively.

SECTION 2 METHODOLOGY

In addressing the issues of mobility outlined in the introduction, two sets of models have been developed. One set estimates the transition rates between labour market states and transitions in and out of benefit receipt. The second set of models analyses the duration of unemployment spells and spells of employment after an unemployment spell.

TRANSITION RATE MODELS

Here respondents are grouped according to five different labour market states: absent from the labour force, unemployed, working part-time (i.e. less than 35 hours per week), working full-time and self-employed. These states are derived from the self-reported labour market activity variables of working, looking for work and absent from the labour market.

Based on this information, the definition of an unemployed person in this study, is anyone who is not working and is concurrently looking for work. In a recent paper, Jones and Riddell (1999) discuss the choice of the definition of unemployment and of being absent from the labour force and show that changing the definition affects the results of analyses. This study excludes people who are discouraged and who are therefore no longer looking for work. However, the definition of looking for work used in this study can be quite 'passive' as the activities that people undertake to find a job were not considered. It also lacks the rigour of the ABS's labour force status definition of unemployment.[1]

Three-staged decision process

It is convenient to describe the decision process between the five labour market states as consisting of three separate stages:

- First, people have to decide whether they want to be in the labour force or not.
- Second, those who want to be in the labour force have to choose between becoming self-employed and looking for employment.
- Finally, in the last stage it is determined whether those who are looking for employment will be unemployed, part-time workers or full-time workers.

The first two stages of the decision process are determined mainly by the supply side of the labour market, although people's labour supply decisions may be influenced by their perception of the level of labour demand. The last stage is influenced by both the supply and demand side of the labour market. For example, people may decide how many

1 For example, the respondent's availability for work is not checked in this definition, whereas it is in the ABS's labour force definition of unemployment.

Three-staged decision process continued

hours they would prefer to work, but whether they can actually work their preferred hours depends on the hours offered to them by employers.

Explanatory variables

What is of interest in this study is knowing whether and why people change labour market or benefit receipt status and what interaction there is between these variables. The explanatory variables used to explore these relationships can be grouped in categories: personal characteristics, household characteristics, geographical location, work history, income and the partner's labour market state and income. See Appendix B for a description of the variables used.

Persistence of labour market state

The approach of including previous labour market behaviour to explain current labour market behaviour was also taken in Nakamurra and Nakamurra (1994), and Shaw (1994). Their rationale for including previous labour market state is that it might serve as a proxy for 'unobservable tastes and other preconditions affecting labour supply that are either persistent or are associated with work behaviour in the previous period' (Nakamurra and Nakamurra, 1994: 318). More generally, it is believed that people normally remain in the same labour market state over time, unless there is a major change in one of the influencing characteristics. This argument is also used by Le and Miller (1999), who estimate an inertia model to predict unemployment using the SEUP data. They classify the 'scar' models of unemployment, which identified past spells of unemployment as affecting the current probability of unemployment, in the category of inertia models.

Although it has disadvantages, labour market state in the previous period (i.e. at September 1995) is also included as an explanatory variable to analyse the probability of having a particular state in the current period (at September 1996). The disadvantage of including this variable is that it may be correlated with some of the other explanatory variables and with the error term (through unobservable characteristics), as the labour market state at an earlier point in time is based on largely the same factors as the present labour market state. As a result of this endogeneity problem, the estimated effects may be biased. However, in this analysis some of the influencing factors may have changed their value over time and other explanatory factors in the model are in fact measuring the change in value of a variable from an earlier time to the present. For example, the variables 'increase labour supply spouse' and 'decrease labour supply spouse' measure changes in labour supply. The change is measured whenever the spouse's labour market state changes, for example from full-time employment in the previous period to out of the labour market in the current period.

Persistence of labour market state continued

Also, because previous labour market state has such a dominant effect on current labour market state, it means that the effect of other characteristics will be much smaller than would otherwise be the case. Only if a characteristic still has an effect after accounting for the previous labour market state is it likely to have an impact on labour market state transitions.

Estimation subgroups

For some of the labour market state groups, it is possible to estimate separate equations according to labour market state and benefit receipt in the previous period. Unfortunately, other groups may be too small for separate estimation. In these cases the only way to examine the relationship between current and previous labour market state is to include labour market state in the previous period as an explanatory variable in the model. Of course, in doing so, it is assumed that the effects of the other characteristics in the model are the same for all people independent of their labour market state in the previous period.

For each of the three decision stages, equations are estimated separately for males and females. This is done because they tend to behave quite differently in the labour market, and factors such as the presence of children influence them in different ways.

Estimation methodology: a bivariate probit model

In stage one of the decision process, the dependent variables are the indicators 'being in the labour force' and 'receiving benefits'. These are analysed using a bivariate probit model.[2] In this model, because the way labour market state and benefit receipt change together is of interest, the probability of these two events is determined simultaneously.

The model is specified as follows:

$$y^*_{i1} = x_{i1}\beta_1 + \varepsilon_{i1} \quad \text{(equation 1)}$$
$$y^*_{i2} = x_{i2}\beta_2 + \varepsilon_{i2} \quad \text{(equation 2)}$$

where $(\varepsilon_{i1}, \varepsilon_{i2})$ is distributed as a bivariate normal BVN$\left(0, 0, \sigma_1^2, \sigma_2^2, \rho\right)$

y^*_{i1} and y^*_{i2} are latent variables, which cannot be observed directly. Instead, we observe $y_{i1} = 1$ if $y^*_{i1} > 0$ and $y_{i1} = 0$ otherwise and
$y_{i2} = 1$ if $y^*_{i2} > 0$ and $y_{i2} = 0$ otherwise.

Thus,
$P(y_{i1} = 1 \text{ and } y_{i2} = 1) = P(y^*_{i1} > 0 \text{ and } y^*_{i2} > 0) = P(\varepsilon_{i1} > -x_{i1}\beta_1 \text{ and } \varepsilon_{i2} > -x_{i2}\beta_2)$.

2 Maddala (1983) gives an extensive overview and explanation of several discrete choice models.

Where,
y_{i1} and y_{i2} are the two observed events of interest, x_{i1} and x_{i2} are the observed characteristics of interest, P(.) represents the probability function, which in this case is the bivariate normal distribution, β_1 and β_2 are the parameter vectors that indicate the effect of the characteristics x_{i1} and x_{i2}, ε_{i1} and ε_{i2} are the error terms and ρ is the correlation coefficient between ε_{i1} and ε_{i2}.

In equation 1, $x_{i1}\beta_1$ simply represents the summation of all characteristics included in the analysis (x_{i1}) multiplied by their estimated coefficients (β_1).

The variances of the error terms are σ_1^2 and σ_2^2, however since we only observe a dichotomous variable instead of the continuous underlying latent variable, these parameters are not identified. Therefore, β_1 / σ_1 and β_2/σ_2 can only be estimated and we may as well assume the variance is equal to 1 and estimate β_1 and β_2.

Note that only one set of coefficients has to be estimated for each dependent variable, because $P(y_i = 1)$ and $P(y_i = 0)$ are complements. The coefficients to be estimated in section 4 are the β_1 and the β_2 vector together with the correlation term ρ. The coefficients cannot be interpreted as easily as in the simple least squares case, where the coefficients represent the effect on the dependent variable of a one-unit change in the independent variable. Here the marginal effect is dependent on the characteristics of the case from which you start. The dependent variable is a dummy variable, and after estimation of the model, a non-linear transformation of $x_{i1}\beta_1$ and $x_{i2}\beta_2$ is needed to produce a value between zero and one, which represents the probability that the dependent variables are one. We are interested in the effect that a change in β_1 or β_2 has on the probability of being absent from the labour force and in receipt of benefit payments. Notwithstanding the more difficult interpretation, a higher value for one of the parameters (which is either part of the β_1– or β_2–vector) means a higher probability for people with a higher value on the relevant characteristic.

The reason for estimating a bivariate probit model rather than two separate probit models, is that it allows for correlation between the two dependent variables without specifying a causal relationship. Allowing for the correlation improves the efficiency of the estimation. Although one would expect some correlation between some of the labour market states and benefit receipt, it is also likely that labour market state and benefit receipt are determined simultaneously by similar characteristics. This means that it may be difficult to determine the direction of the causal relation. Therefore, including one or both of the dependent variables as an independent variable in the equation with the other variable as the dependent variable is not correct.

Estimation methodology: a bivariate probit model continued

In stage two of the decision process, the dependent variables are the indicators for being self-employed and for receiving benefits. They are also analysed using a bivariate probit model. This model is only estimated for respondents in the labour force.

Estimation methodology: a trinomial logit model

Stage three of the decision process involves a trichotomous variable indicating whether someone is unemployed, working part-time or working full-time. A multinomial logit analysis[3] is used to analyse this variable for all respondents in the labour force who are not self-employed. Here a logit model is preferred over a multinomial probit, because of its simplicity and because probits are difficult and time consuming to estimate for more than two categories. The difference between a logit and a probit model lies in the specification of the error terms of the model. A logit model uses the logistic specification and a probit model assumes the error terms have a normal distribution.

In a multinomial logit analysis, the dependent variable consists of more than two categories. In this instance there are three—unemployed, working full-time and working part-time. The probability of being in any one of these categories is estimated using the following trinomial model:

$$P(y_i = 0) = \frac{1}{1 + \exp(x_i\beta_1) + \exp(x_i\beta_2)},$$

$$P(y_i = 1) = \frac{\exp(x_i\beta_1)}{1 + \exp(x_i\beta_1) + \exp(x_i\beta_2)},$$

$$P(y_i = 2) = \frac{\exp(x_i\beta_2)}{1 + \exp(x_i\beta_1) + \exp(x_i\beta_2)}.$$

Where,

y_i is the observed event of interest, for which there are three possible outcomes, x_i represents the observed characteristics of interest, $P(.)$ represents the probability function, which in this case is the logistic distribution and β_1 and β_2 are the parameter vectors that indicate the effect of the characteristics x_i on respectively the probability of observing $y_i = 1$ and $y_i = 2$.

By definition, the three probabilities above add up to one, so if two of the probabilities are known the third one can be calculated. This means that one of the probabilities has to be normalised, so all coefficients related to the first category are set to zero (and the exponential of zero equals one). Only two sets of parameter vectors have to be estimated to obtain the three probabilities. As in the probit analysis, there is an underlying unobserved variable, in fact in the trinomial logit model there are two variables (equal to $x_i\beta_1$ and $x_i\beta_2$), that represent the value of

3 See Maddala (1983) for an extensive discussion of this model.

Estimation methodology: a trinomial logit model continued

the two latter categories for each of the respondents as compared to the first category. The higher the value of these variables the higher the probability that a particular respondent will be in the corresponding category. Interpretation of β_1 and β_2, is therefore, similar to the interpretation of coefficients in the bivariate probit model. The higher the estimated value of the coefficient the higher the effect of the corresponding characteristic on the probability of being in that category.

A simplified dichotomous version of this variable, indicating whether someone is unemployed, is used together with an indicator for receiving benefits, to estimate a bivariate probit model similar to those in the previous two stages.

The number of models

One of the reasons for not estimating separate equations for each labour market state in the previous period is that it would quadruple the required number of models. In this analysis there are 16 models used to estimate transitions—that is, each combination of sex, labour market decision stage and survey group is modelled separately.

DURATION MODELS

Transition models do not make full use of the continuous nature of the data. A more detailed analysis of transition from one labour market state to another can be made through hazard rate analysis, a tool which examines the exit rate from one state to another, conditional on being in a certain state for a period of time.

Job search theory

The duration of unemployment spells may depend on labour supply factors, such as a readiness to accept all job offers; or on labour demand factors, such as the unemployment rate in the region where the unemployed person is engaged in job search. In theoretical search models (as introduced by Mortensen, 1977), it is assumed that job seekers have imperfect information on the labour market. Job search is not without cost and each time an application leads to a job offer, the job seeker has to decide whether to accept or reject it. Rejection means that search costs continue and there is a loss of expected income. Acceptance means that a possibly higher future wage offer cannot be realised. 'Job Search Theory' assumes that people do not continue to look for work after accepting a job offer and that the decision on accepting or rejecting a job offer is based on whether the market wage

Job search theory continued

offered is higher than the reservation wage.[4] Thus, unemployment duration is determined by the probability that an unemployed person will be offered a wage that is higher than the reservation wage, and when an unemployed person sets his/her reservation wage higher, the duration of the unemployment spell is expected to increase. A structural model to analyse durations would include equations for the reservation wage and the market wage. For the moment, we only estimate the reduced form equation for unemployment duration. However, the variables to include in this reduced form analysis still relate to the underlying structural model.

Estimation methodology: Weibull hazard rate model

The Weibull hazard rate model, where the exit rate from unemployment monotonically increases or decreases with time spent in unemployment up to this moment, can be expressed:

$$h(t_i) = \exp(x_i\beta)\alpha t_i^{\alpha-1} \text{ with } \alpha > 0.$$

From this an expected duration can be derived:

$$E(t_i) = \exp\left(-\frac{x_i\beta}{\alpha}\right)\Gamma\left(1+\frac{1}{\alpha}\right)$$

In these equations, $x_i\beta$ simply represents the summation of all characteristics included in the analysis (x_i) multiplied by their estimated coefficients (β). The parameter α represents the duration dependence of the exit rate. Usually a negative duration dependence (α between zero and one) is found, which implies that the longer someone has been unemployed the less likely they are to exit from unemployment.

The dependent variable in a hazard rate model is the duration of the unemployment spell combined with the information as to whether this is a censored spell or not.[5] Interpretation of the parameters is relatively easy. The following expression:

$$100 \times \left(\exp(\beta) - 1\right)$$

gives the percentage change in the exit rate as a result of a one unit increase of the relevant characteristic.

4 The reservation wage is the job seeker's minimum acceptable wage rate, where the expected return to job search for another period is equal to the expected cost of searching for another period.

5 A censored (or incomplete) spell is one which is ongoing at the end of the reference period. The exact duration of such a spell is unknown.

Estimation methodology: Weibull hazard rate model continued

The estimation results in sections 5 and 6 that will be presented are $-\beta/\alpha$. These can be interpreted with regard to the effect of characteristics on duration rather than on exit rate. Thus the following expression:

$$100 \times \left(\exp(-\beta / \alpha) - 1\right)$$

represents the percentage change in duration as a result of a one unit increase in the explanatory variable.

Analyses of spells

Hazard rate analysis[6] is used to analyse all complete and incomplete unemployment spells over the first two years of the survey period.[7] It is also used to analyse all complete and incomplete spells of employment that followed a spell of unemployment. Over the survey period individual respondents may have had any number of employment and unemployment spells. For example, one respondent may have had just the one spell of unemployment and no spells of employment, whereas another may have had three or four spells of unemployment and employment. As these spells are the unit of observation, it follows that for each analysis, some respondents will not be represented, whereas others may appear more than once.

Explanatory variables affecting unemployment

Some explanatory variables in a hazard rate analysis may influence the labour supply side (that is, the reservation wage), others may influence the demand side (that is, the market wage), and some may influence both supply and demand sides.

Variables that are included in the analysis are:

- Labour supply variables, they include time dummies to identify changes in policy rules, other income and benefit receipt.
- Labour demand variables, they include regional quarterly vacancy to unemployment ratio, urbanisation, and state of residency.
- Demand and supply side variables, they include age, education level, English proficiency, recent immigrant status, gender, household composition, work history and disability status.

6 See, for extensive discussion of these models, Lancaster (1990).

7 The last year of the survey was not included, since at the time of the analysis the DSS administrative data containing benefit receipt information from the third year of the survey were not available. Benefit receipt is an explanatory variable in the duration analysis.

Explanatory variables affecting employment

The duration of employment spells depends, as with the duration of unemployment spells, on both demand and supply side factors in the labour market. Employees can either be terminated by the employer (for various reasons, to do with the job or their personal performance) or they can decide to resign. The dependent variable in this analysis is the duration of employment (either the complete or incomplete spell). One would expect negative duration dependence, since the longer someone has been employed the less likely they are to exit employment.

The same variables as in the unemployment spell analysis are used, which enables us to compare the effects of all characteristics on both employment and unemployment spells. This should reveal those who are more likely to experience a sequence of short unemployment and employment spells. In addition to these variables, the type of job is included as well, to distinguish between people in part-time, full-time and self-employment.

Further work

The employment duration model could be extended to include more characteristics of the job and the employer. The unemployment duration model may then be extended as well, by including information on people's occupation or industry of employment, although these characteristics may not be constant over one's career. This could give an insight into the labour market state (including the occurrence of unemployment spells between jobs) of people working in different occupations or industries.

NOTE ON WEIGHTING OBSERVATIONS

In this study, the analyses use unweighted observations as input. The aim of this study is not to generate numbers representing the whole population (which would necessitate the use of weights), but to analyse the relationship between certain variables. Imbens and Lancaster (1996) and Magee, Robb and Burbidge (1998) explain that no adjustments to the ordinary method of estimation are necessary as long as the probability of a unit of the population being included in the survey is independent of the value of the dependent variable in the model of interest. Adjusting without the necessity to do so means a loss of efficiency.

SECTION 3 THE SURVEY OF EMPLOYMENT AND UNEMPLOYMENT PATTERNS

The Survey of Employment and Unemployment Patterns (SEUP) was carried out in three waves between September 1994 and September 1997. Respondents were recruited into the survey between April and July 1995, they were aged between 15 and 59 years, lived in private dwellings and came from both urban and rural areas.

The Australian Bureau of Statistics (ABS) has published several reports and information papers on the survey, which provide information on the panel components, definitions and methodology of the survey (see for example: ABS, 1997a, 1997b, 1997c, and 1998a). This section commences with a brief description of the survey, and then discusses the selection criteria for the different analyses and the populations selected for the study. Finally, the data examined in the study are described by providing summary statistics for the dependent variables used in the transition rate and employment and unemployment duration analysis.

GENERAL DESCRIPTION

The SEUP was a longitudinal survey set up to provide information on the dynamics of the labour market, in order to assess the impact of labour market assistance initiatives in alleviating joblessness in Australian society. However, the data set obtained from the SEUP also contains a wealth of other information—for example, data on personal and household characteristics, labour market activities, income, benefit receipt, training and education are collected through time.

The longitudinal variables

In the yearly interviews, questions were asked about current personal and household characteristics, labour force status, income received and income sources (for example, social security receipt). Respondents were also asked to recall for the preceding 12 months episodes of looking for work, working and absence from the labour market—these were called labour market activities. They were also asked to recall details of training and any job offers they had received.

In addition, and with the respondent's consent, information on social security receipt and participation in labour market programs was made available from the administrative systems of the Department of Social Security (DSS) and the Department of Employment, Education, Training and Youth Affairs (DEETYA) respectively.

From all the above information it was possible to describe what the respondent was doing at any time during the survey reference period.

The survey groups

In the SEUP there were three groups—Jobseekers, a Population Reference Group and a sample of known Labour Market Program Participants. In this study, the analysis is based on data from the Jobseekers group and, for the purpose of comparison, the Population Reference Group. The following is a brief description of these two groups;

Jobseekers—comprise people most likely to be eligible candidates for Labour Market Programs. At the time of recruitment, the sample predominantly comprised the unemployed, plus smaller numbers of people who were underemployed or who had a marginal attachment to the labour force.

The *Population Reference Group*—is a smaller group, representative of the general Australian population. It is used to provide a benchmark for analysis of the Jobseeker sample. The small size of this group places some limitations on the detail of the analysis.

SELECTION CRITERIA

Full-time students and contributing family workers[1] are excluded from the analyses of the two subgroups. In addition, for most analyses suggested information on benefit payments from the DSS administrative data is required. Therefore, consent to use the administrative data from DSS is also a selection criterion in the analyses using benefit information. From the SEUP data collected at interview the consent rates for those who indicated that they did not receive social security payments were found to be lower than for those who did receive payments. Therefore, the sample size of those not receiving any DSS payments was boosted by also including those who did not give consent and also reported no DSS payments in each of the three surveyed years. This improved the sample size considerably, from 3,980 to 4,388 for Jobseekers and from 986 to 1,898 for the Population Reference Group (see table 3.1).

The last selection criterion was the exclusion of records with missing values on any of the relevant variables. This was determined separately for each analysis, consequently a record can contribute to one analysis, but be excluded from another.

1 The issues full-time students are facing, with regard to the labour market, are quite different from those of other people. It is expected that for students, work is secondary to their study. The group of contributing family workers is very small (only 56 persons in both subgroups together) and it is not clear whether to group them with self-employed people or wage and salary earners. They seem a very heterogeneous group with regard to earnings (some do not have any earnings at all) and hours worked (from about 10 to 70 hours per week), which makes it hard to decide to which category they belong. For these reasons they were left out of the analysis.

3.1 SAMPLE SIZE USING DIFFERENT SELECTION CRITERIA

Subgroup	Sample size after: excluding full-time students/contributing family workers	excluding those without DSS consent	including those without reported DSS payments
Population Reference Group	2 094	986	1 898
Jobseekers	4 862	3 980	4 388

ATTRITION

Another relevant issue with longitudinal data is attrition. Attrition is the occurrence of incomplete observations, caused by non-response in one of the later waves of a longitudinal survey. This non-response could be caused, for example, by the inability to locate the respondent after they have moved, or by the respondent's refusal to participate any longer. To get a feeling for the potential impact of attrition, a simple attrition study was performed (following Harris, 1996).

A dichotomous variable indicating whether all three waves have been completed, is regressed on the relevant variables in this study. The results indicate whether any of the variables relevant in this study influenced attrition to a smaller or larger extent.[2] To account for selective attrition and avoid biased estimates, the model should be estimated separately on subgroups with different attrition rates.

Attrition effects

The results of this analysis for the Population Reference Group indicate that the effect of most variables is insignificant at the 5% level. Three dummy variables that indicate which labour market state is current at the end of the first wave are significant and have a positive effect on the probability of dropout, but, as is already explained in section 2, the subgroups would be too small for a separate estimation. Living in a rural area, and an increasing income for the spouse, have a significant negative effect on the attrition rate. That is, respondents in rural areas and respondents with high-income spouses are less likely to drop out.

Among Jobseekers, only one of the labour market state variables—the indicator that someone is absent from the labour force—had a significant positive effect on the attrition rate, which means that people out of the labour force were more likely to drop out of the survey. Other significant positive effects were observed for migrants who entered Australia after 1984, people out of the labour force, males and to a larger extent, males with children between six and 12 years old.

2 See Appendix A.

Attrition effects continued

Having a large number of children, higher levels of education, being in receipt of training,[3] living in a non-capital city, living in South Australia or Tasmania, receiving benefits, having a larger business or property income, a level of English proficiency of less than 'good' and being a female with children aged between six and 12 had significant negative effects on attrition for Jobseekers, i.e. they reduced the likelihood of dropping out of the survey.

Controlling for these effects by subdividing the data into categories based on education, children or region would make the subgroups quite small. In addition, none of these variables are significant in the Population Reference Group. The only subdivision that results in subsamples of a reasonable size is by gender (this variable was also significant at the 10% level in the Population Reference Group estimation). This subdivision also seems sensible from a labour market point of view based on the different behaviour of males and females.

The analysis of spell durations is probably less affected by attrition, because in principle, observations affected by attrition can still be included in the analysis before dropping out of the survey.[4] Those observations can then be classified as censored, or incomplete, durations.

TRANSITION RATE VARIABLES

Creation of the labour market state variable

The variable *Labour market state* indicates whether a respondent is out of the labour force, unemployed, working part-time, working full-time or self-employed at the end of each wave and is derived from episodes of labour market activity—that is, episodes of working, looking and absence from the labour market.

As a respondent can have concurrent episodes of work and as episodes of looking for work can occur concurrently with episodes of work, a series of steps were followed in deriving labour market state.

If a respondent has at least one current working episode involving self-employment, then the respondent's Labour market state is self-employed. If the respondent has current working episodes, but none involve self-employment, then the hours worked per week in each of these jobs is added up. If the total is more than 35 hours per week then the labour market state is working full-time, or else it is working part-time.

3 Training includes both 'in-house' and external training courses. The external courses are mainly short courses taken to improve job skills.

4 Van den Berg, Lindeboom and Ridder (1994) propose a method to deal with attrition in duration data. However, their approach would involve bivariate hazard rate models, which could not be estimated with LimDep (the econometric computer package that is available at the ABS) and is therefore not in the scope of this study.

Creation of the labour market state variable continued

If the respondent has no current working episodes then the current labour market activity will be either looking for work (in which case the labour market state is unemployed) or absent from the labour market (in which case the labour market state is out of the labour force). Table 3.2 gives the frequencies of the different labour market states for Jobseekers and the Population Reference Group in the three waves.

3.2 LABOUR MARKET STATE—SEPTEMBER

	Population Reference Group			*Jobseekers*		
	1995	*1996*	*1997*	*1995*	*1996*	*1997*
Labour market state	*%*	*%*	*%*	*%*	*%*	*%*
Out of labour force	18.1	17.9	18.8	12.4	16.7	19.4
Unemployed	7.8	7.3	6.9	54.0	34.7	29.3
Working part-time	13.9	13.9	13.5	14.1	16.4	17.2
Working full-time	47.8	47.8	46.5	15.7	26.3	27.4
Self-employed	12.4	13.1	13.3	3.8	5.8	6.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	no.	no.	no.	no.	no.	no.
Sample size	2 093	1 920	1 800	4 860	4 202	3 740

Distribution of labour market state

In table 3.2, it can be seen that the distribution of labour market state of respondents from the Population Reference Group over the five labour market states remains quite stable over time. This does not necessarily mean that they are stationary, since respondents could move between labour market states in counteracting flows.

Jobseekers, in contrast, have increases in the proportion of respondents who are working full-time, self-employed and out of the labour force,[5] and decreases in the proportion of unemployed people. This seems to indicate that, although part of the shifts in labour market state may be attributed to different levels of attrition, many of the respondents who were in 1995 looking for a job settle down over time either in employment or by giving up and moving out of the labour force. When comparing the two groups it can be seen that the distribution over labour market states becomes more similar towards the end of the survey, although the proportion who are unemployed remains much larger for Jobseekers.

5 It also increased in absolute numbers (except for the number of full-time workers in 1997). This means that generally, the numbers in full-time employment and self-employment increase, even though the total number of remaining respondents in the sample decreases through attrition.

Attrition rate and labour market state

Attrition was clearly a larger problem for Jobseekers (23% between September 1995 and September 1997) than for the Population Reference Group (14% between September 1995 and September 1997). As attrition reflects a higher level of geographic mobility, factors such as moving into cheaper accommodation or moving in order to increase work prospects probably contributed to these high rates.

Among Jobseekers, full-time workers (14% after the first year and 11% after the second year), unemployed people (14% after the first year and 13% after the second year) and people out of the labour force (14% after the first year and 9% after the second year) had the highest levels of attrition. For both the Population Reference Group and for the Jobseekers, the self-employed had the lowest attrition rates (see table A.1 in Appendix A).

Labour market state transitions

From Table 3.3 it can be seen that, with the exception of the unemployed state, Jobseekers are less likely to remain in any labour market state from one year to the next than respondents from the Population Reference Group. This is partly a selection issue. For example, all Jobseekers were at least marginally attached to the labour force at recruitment. Thus even if they were out of the labour force they might have taken a job if it was offered. This level of availability is not typical for respondents from the Population Reference Group who were out of the labour force.

3.3 CHANGES IN LABOUR MARKET STATE

	Proportion changed state from Sep 1995 to Sep 1996		*Proportion changed state from Sep 1996 to Sep 1997*	
	Population Reference Group	*Jobseekers*	*Population Reference Group*	*Jobseekers*
Labour market state at Sep 1995	*%*	*%*	*%*	*%*
Out of labour force	23.9	41.7	17.6	30.4
Unemployed	51.1	50.9	43.3	40.8
Working part-time	33.6	55.0	28.0	42.1
Working full-time	12.3	35.1	11.7	29.6
Self-employed	13.9	35.4	11.9	22.0
Total	**100.0**	**100.0**	**100.0**	**100.0**
	no.	no.	no.	no.
Sample size	1 920	4 202	1 800	3 740

Even though there is little variation in the overall distribution of labour market state during the course of the survey, there is still considerable movement between labour market states from one year to the next for the Population Reference Group. This implies that the flows between the different labour market states must counteract each other to a large extent.

In both samples, working full-time and being self-employed are the most stable labour market states. For example, only 12% of full-time workers from the Population Reference Group and 35% of Jobseekers working full-time changed labour market state between 1995 and 1996. This difference between Jobseekers and people in the Population Reference Group may be because Jobseekers end up in less secure employment. Further evidence of this is the higher proportion of part-time workers and unemployed in the Jobseeker group. Also Jobseekers were more likely to move into unemployment from 1995 to 1996 (see table 3.4).

Labour market state was more stable from 1996–97 than it was from 1995–96. This was partly caused by attrition, where respondents who change labour market state are more geographically mobile and therefore more likely to drop out of the survey.

3.4 TRANSITIONS IN LABOUR MARKET STATE—SEPTEMBER 1995 TO SEPTEMBER 1996

	Labour market state in September 1996					
Labour market state in September 1995	*Out of the labour force*	*Unemployed*	*Working part-time*	*Working full-time*	*Self-employed*	*Total*
	%	%	%	%	%	no.
	POPULATION REFERENCE GROUP(a)					
Out of labour force	76.1	7.7	9.1	5.0	2.1	339
Unemployed	14.9	48.9	12.8	20.6	2.8	141
Working part-time	9.2	5.2	66.4	17.7	1.5	271
Working full-time	3.4	3.0	3.2	87.7	2.7	924
Self-employed	3.7	1.2	3.3	5.7	86.1	245
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	JOBSEEKERS(b)					
Out of labour force	59.3	19.7	10	7.5	3.5	519
Unemployed	13.5	49.1	12.6	20.8	3.9	2263
Working part-time	8.5	18.2	45	25.5	2.8	600
Working full-time	4.3	18.3	10.5	64.9	2	656
Self-employed	6.1	10.4	7.3	11.6	64.6	164
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Sample size was 1,920.
(b) Sample size was 4,202.

Transitions for those from the Jobseeker and the Population Reference Group who were unemployed at September 1995 are very similar. This similarity still applies when these transitions are examined in more detail (table 3.4). For both groups, 21% of those who were unemployed at September 1995 were working full-time after one year and 13% were working part-time. A further 3–4% were self-employed and 14–15% were no longer in the labour force.

Labour market state transitions continued

However, transitions from other labour market states and transitions into unemployment were much greater for Jobseekers. This is indicative of a more unstable employment situation, that is reflected in a greater proportion of unemployed and part-time workers in the Jobseeker group.

Creation of the benefit receipt variable

The dummy variable *Benefit Receipt* indicates whether a respondent is receiving any benefits at the end of each wave. The different types of benefits have been aggregated into the following: unemployment benefits consisting of Job Search Allowance, Newstart Allowance, Youth Training Allowance, and Mature Age Allowance;[6] sole parent benefits consisting of Sole Parent Pension; partner or parenting benefits consisting of Partner Allowance, Mature Age Partner Allowance and Parenting Payments; disability or sickness benefits consisting of Disability Support Pension and Sickness Allowance; and other benefits. If more than one type of benefit is current at one moment in time, the category selected is the one where the largest amount of money is received. This affected only 0.4% of respondents at the end of the first wave and 0.6% at the end of the second wave.

Distribution of benefit receipt

Looking at table 3.5, it can be seen that the distribution over the different benefit types remains fairly constant between September 1995 and September 1996 for the Population Reference Group, whereas the Jobseekers show modest increases in all types of benefit receipt except for unemployment benefits, which decreased from 32% to 25%.

From table 3.5 it can be concluded that the Jobseekers were more likely to receive benefit payments (with the exception of those in the category of other benefits) than people from the Population Reference Group. This is expected, since a greater proportion of Jobseekers were out of work during the survey. However, it should also be noted that a substantial proportion of Jobseekers do not receive any benefits (either because of their own or their partner's income or because they are in some other way ineligible).

6 People on the Mature Age Allowance are in principle not obliged to look for work. Since this allowance is available only to males aged 60 or over and females aged 55 or over, very few people in the sample receive it. Therefore they are included with other employment benefits.

3.5 BENEFIT RECEIPT—SEPTEMBER

	Population Reference group		*Jobseekers*	
	1995	*1996*	*1995*	*1996*
Type of benefit	*%*	*%*	*%*	*%*
No benefits	86.1	87.0	58.9	61.9
Unemployment	4.2	3.6	31.6	25.1
Sole parent	3.1	2.9	3.6	4.6
Partner/parenting	2.6	2.4	2.9	3.5
Disability/sickness	2.1	2.0	1.8	3.4
Other benefits	1.9	2.0	0.9	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**
	no.	no.	no.	no.
Sample size(a)	1 937	1 776	4 456	3 888

(a) The sample sizes are smaller than in table 3.2 as there are more records missing information on benefit receipt than on labour market state.

The transition in benefit receipt

Compared with labour market state transitions, the transition rates for benefits were quite low. For example, it can be calculated from Table 3.6 that 13% of the Population Reference Group changed benefits, whereas 20% changed labour market state (comparative figures for the Jobseekers were 32% and 47%).

For the Population Reference Group, the probability of exit from sole parent pensions, partner/parenting benefits or other benefits seems lower than for the Jobseekers (although the observed numbers are so low that it is unlikely to be statistically significant). These benefits do not require recipients to look for work. However, as most Jobseekers were looking for work at the time of recruitment, a possible reason for their higher exit rate is because they were more likely to start working and become independent of these benefits than similar people from the Population Reference Group.

In both groups it can be observed that people receiving unemployment benefits are much less likely to remain on benefits than people receiving one of the other benefits. This is probably caused by the fact that people receiving unemployment benefits have to look for work and to accept job offers to remain eligible. Other benefits do not have this requirement.

For the Population Reference Group, only 3% of those receiving no benefits in the first year were receiving any benefits in the second year. Jobseekers who did not receive any benefits in September 1995, were more likely to receive benefits in September 1996 (14%). The probability that Jobseekers exit from unemployment benefits or disability/sickness benefits seems lower than the probability for the Population Reference Group (although the numbers observed are again too small for the difference to be statistically significant).

3.6 TRANSITIONS IN BENEFIT RECEIPT—SEPTEMBER 1995 TO SEPTEMBER 1996

	Benefit receipt in September 1996						
Benefit receipt in September 1995	No benefits	Unemployment	Sole parent	Partner/ parenting	Disability/ sickness	Other benefits	Total
	%	%	%	%	%	%	no.
POPULATION REFERENCE GROUP(a)							
No benefits	97.5	1.5	0.1	0.3	0.2	0.3	1 507
Unemployment	40.9	56.1	0.0	0.0	3.0	0.0	66
Sole parent	0.0	2.0	94.1	3.9	0.0	0.0	51
Partner/parenting	20.8	2.1	4.2	72.9	0.0	2.1	49
Disability/sickness	8.4	5.6	0.0	0.0	86.1	0.0	36
Other benefits	6.1	0.0	0.0	0.0	0.0	93.9	33
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
JOBSEEKERS(b)							
No benefits	86.1	8.4	1.4	2.2	1.5	0.4	2 201
Unemployment	32.2	63.7	0.2	0.5	2.5	0.9	1 225
Sole parent	4.6	1.3	91.4	1.3	0.0	1.3	152
Partner/parenting	22.3	3.3	5.6	67.8	0.8	0.0	121
Disability/sickness	0.0	2.9	0.0	0.0	97.1	0.0	68
Other benefits	2.6	2.6	5.3	0.0	0.0	89.5	38
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Sample size was 1,898.
(b) Sample size was 4,388.

Labour market state by benefit receipt

From table 3.7 and 3.8 some interesting differences between the two samples emerge. While the proportion of Jobseekers who where not working (i.e. either unemployed or out of the labour force) and not receiving benefits at September 1995 is similar to the Population Reference Group, by September 1996 a greater proportion of Jobseekers who were not working were receiving benefits.

Among those who worked, the general level of reliance on benefits was higher for Jobseekers than for the Population Reference Group. This difference was most pronounced for the self-employed (33% of self-employed Jobseekers were on benefits in September 1995 compared to only 4% from the Population Reference Group) and for part-time workers (33% compared to 17%).

Although their level of benefit receipt was higher than for their peers in the Population Reference Group, reliance on benefits, among Jobseekers who worked, declined considerably between September 1995 and September 1996. This was most evident among those Jobseekers who were self-employed. At September 1995 almost a third of these Jobseekers received benefits. By September 1996, although the overall number of self-employed Jobseekers rose, this figure had dropped to just over a quarter.

Most of the difference in the level of receipt of benefits between Jobseekers and the Population Reference Group can be attributed to unemployment benefits. A far larger percentage of Jobseekers across all labour market states (including full-time work)[7] receive these benefits than do people in the Population Reference Group.

3.7 LABOUR MARKET STATE AND BENEFIT RECEIPT—SEPTEMBER 1995

	Benefit receipt						
	No benefits	*Unemployment*	*Sole parent*	*Partner/ parenting*	*Disability/ sickness*	*Other benefits*	*Total*
Labour market state	*%*	*%*	*%*	*%*	*%*	*%*	*no.*
			POPULATION REFERENCE GROUP(a)				
Out of labour force	59.5	0.6	10.4	11.0	10.1	8.2	326
Unemployed	47.2	38.2	7.6	4.9	1.4	0.7	144
Working part time	83.5	7.3	5.0	0.8	1.1	2.3	261
Working full time	99.2	0.3	0.0	0.3	0.0	0.2	964
Self-employed	95.9	1.2	0.8	0.8	0.8	0.4	242
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
			JOBSEEKERS(b)				
Out of labour force	60.4	11.0	10.4	8.4	6.9	2.8	536
Unemployed	46.5	45.5	3.4	2.6	1.3	0.8	2371
Working part time	66.6	25.8	4.0	1.8	1.1	0.8	628
Working full time	89.0	9.4	0.7	0.4	0.3	0.3	747
Self-employed	67.1	23.7	3.5	4.6	0.6	0.6	173
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Sample size was 1,937.
(b) Sample size was 4,455.

7 Aside from measurement error, a possible reason for this finding is that full-time work is defined as 35 hours or more per week which is slightly lower than the standard hours of 38 to 40 hours per week. Second, people with income above the cut off point for unemployment benefits can remain qualified for benefits for up to 12 weeks with a nil rate of payment.

3.8 LABOUR MARKET STATE AND BENEFIT RECEIPT—SEPTEMBER 1996

	Benefit receipt						
	No benefits	*Unemployment*	*Sole parent*	*Partner/ parenting*	*Disability/ sickness*	*Other benefits*	*Total*
Labour market state	*%*	*%*	*%*	*%*	*%*	*%*	*no.*
	POPULATION REFERENCE GROUP(a)						
Out of labour force	62.0	2.1	6.3	10.1	9.8	9.8	287
Unemployed	49.6	29.1	13.4	3.9	2.4	1.6	127
Working part-time	87.2	2.9	5.8	2.1	0.8	1.1	242
Working full-time	98.6	0.9	0.1	0.2	0.1	0.0	884
Self-employed	94.1	2.5	0.8	0.4	0.8	1.3	236
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	JOBSEEKERS(b)						
Out of labour force	48.0	13.2	9.2	11.3	13.5	4.8	621
Unemployed	38.4	50.8	4.3	2.8	2.3	1.4	1 319
Working part-time	65.4	22.5	7.5	2.5	1.4	0.6	639
Working full-time	93.9	3.7	1.1	0.5	0.6	0.2	1 081
Self-employed	74.4	16.7	2.6	4.4	0.9	0.9	227
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Sample size was 1,776.
(b) Sample size was 3,888.

DURATION VARIABLES

Duration of labour market state

Jobseekers spent considerably less time out of the labour force, in full-time work and in self-employment than people in the Population Reference Group. However, the average number of spells in each of these labour market states is similar for both groups, implying that these spells are of shorter average duration for Jobseekers. For example, on average Jobseekers had 0.87 spells and 181 days of full-time work, thus the average full-time work spell was 208 days (i.e. 181 divided by 0.87). For the Population Reference Group the average spell of full-time work was 656 days.

Although Jobseekers are also more likely to have a spell of part-time work than the Population Reference Group (0.71 compared to 0.35 spells), the spells are on average much shorter (an average of 193 days compared to 404 days).

For Jobseekers, unemployment dominates; they spent an average of 444 days unemployed (with an average length of unemployment spell of 250 days). Those from the Population Reference Group spent an average of only 76 days unemployed, and unemployment spells averaged 184 days. These results provide further evidence that Jobseekers have less secure employment than people from the Population Reference Group.

3.9 LABOUR MARKET STATES—1994–97

	Population Reference group(a)		Jobseekers(b)	
	Average duration	Average spells	Average duration	Average spells
Labour market state	days	no.	days	no.
Out of labour force	185.2	0.48	150.5	0.74
Unemployed	75.8	0.41	444.4	1.78
Part-time work	140.6	0.35	137.6	0.71
Full-time work	482.3	0.74	181.3	0.87
Self-employed	126.7	0.19	44.8	0.15

(a) Sample size was 2,093.
(b) Sample size was 4,860.

Duration of benefit receipt

From table 3.10 it can be seen that Jobseekers spend a much larger amount of time in unemployment benefits than the Population Reference Group. This is consistent with table 3.9 which shows that unemployment is the dominant labour market state for Jobseekers.

For the remaining benefits there is little difference between Jobseekers and the Population Reference Group. For example, the respondents from the Population Reference Group spent an average of 20 days on the sole parent pension and 14 days on 'other' benefits. The corresponding durations for Jobseekers are 27 days and 8 days.

3.10 BENEFIT RECEIPT—1994–96

	Population Reference group(a)		Jobseekers(b)	
	Average duration	Average spells	Average duration	Average spells
Benefit receipt	days	no.	days	no.
Unemployment benefits	29.4	0.15	213.5	1.04
Sole parent pension	20.4	0.04	26.7	0.05
Partner/parenting allowance	10.9	0.07	12.6	0.09
Disability/sickness allowance	14.4	0.03	14.5	0.05
Other benefits	14.0	0.03	7.7	0.03

(a) Sample size was 1,898.
(b) Sample size was 4,388.

SECTION 4 CHARACTERISTICS AFFECTING LABOUR MARKET STATE AND BENEFIT RECEIPT

The transition tables presented in section 3 made it clear that while most people are unlikely to experience a change in benefit receipt or labour market state from one year to another, there are still substantial numbers of people who do experience changes. The tables also show that the probability of moving into a particular labour market state or being in receipt of a particular benefit in the current period is influenced by the labour market state/benefit receipt in the previous period. For example, Jobseekers who worked part-time in September 1995 were more likely to be employed full-time in September 1996 than those who were unemployed. Warburton et al (1999) found a similar result.

This section uses multivariate techniques to provide a more in-depth examination of transition rates between September 1995 and September 1996. In performing this analysis the first labour market issue will also be addressed. That is, the characteristics that are associated with particular labour market states and benefit receipt are examined.

SECTION OUTLINE

In modelling transitions the labour market state equations (i.e. equations for labour force participation, self-employment and unemployment) are estimated simultaneously with the equation for benefit receipt using bivariate probit models. A trinomial logit model is estimated for the 'choice'[1] between unemployment, part-time and full-time work (in this model benefit receipt is not included for reasons of simplicity). As these four models are estimated separately for males and females from the Jobseeker and Population Reference Group, 16 different transition rate models are produced. The full tables for these models can be obtained from the author or found on the internet at http://www.abs.gov.au.

A detailed discussion of each model is beyond the scope of this paper. Instead, main findings across all models are examined and results that are significant (at the 5% level) for the labour market state equation and the benefit receipt equation are discussed. Relevant effects are described for each group of characteristics, which include age, education and training, presence of children, disabilities, State of residency, benefits, income, spousal income and work history.

CHARACTERISTICS AFFECTING LABOUR MARKET STATE

In all labour market state equations, 'Previous labour market state' is included. Because this variable has such a strong influence on current labour market state in all labour market state equations, the effect of other characteristics is diminished. After taking this into account, there still remain some significant characteristics that have the potential of inducing a change in labour market state. An overview of these significant characteristics for the 16 transition rate models is presented in charts 4.1 to 4.5.

1 The first two stages are more about choice than this stage, which may be largely influenced by demand factors.

Chart 4.1 Characteristics affecting labour force absence in September 1996

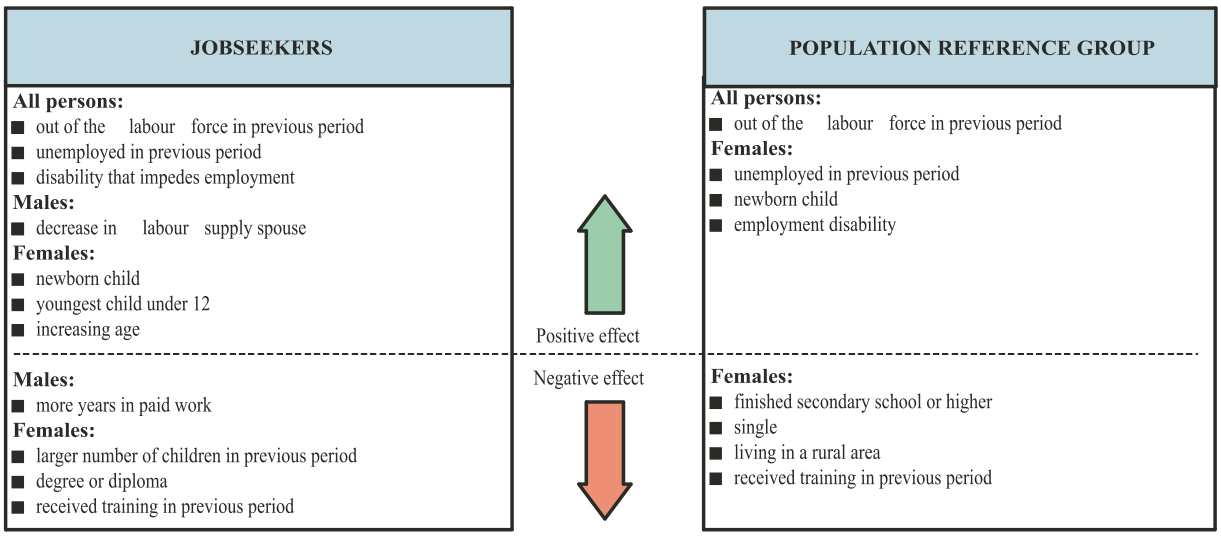


Chart 4.2 Characteristics affecting self-employment in September 1996

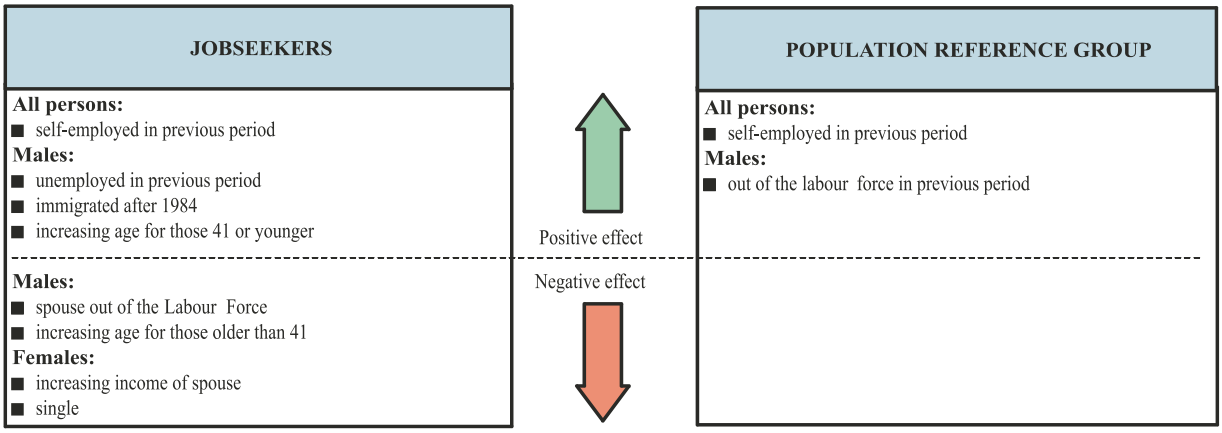


Chart 4.3 Characteristics affecting part-time employment in September 1996

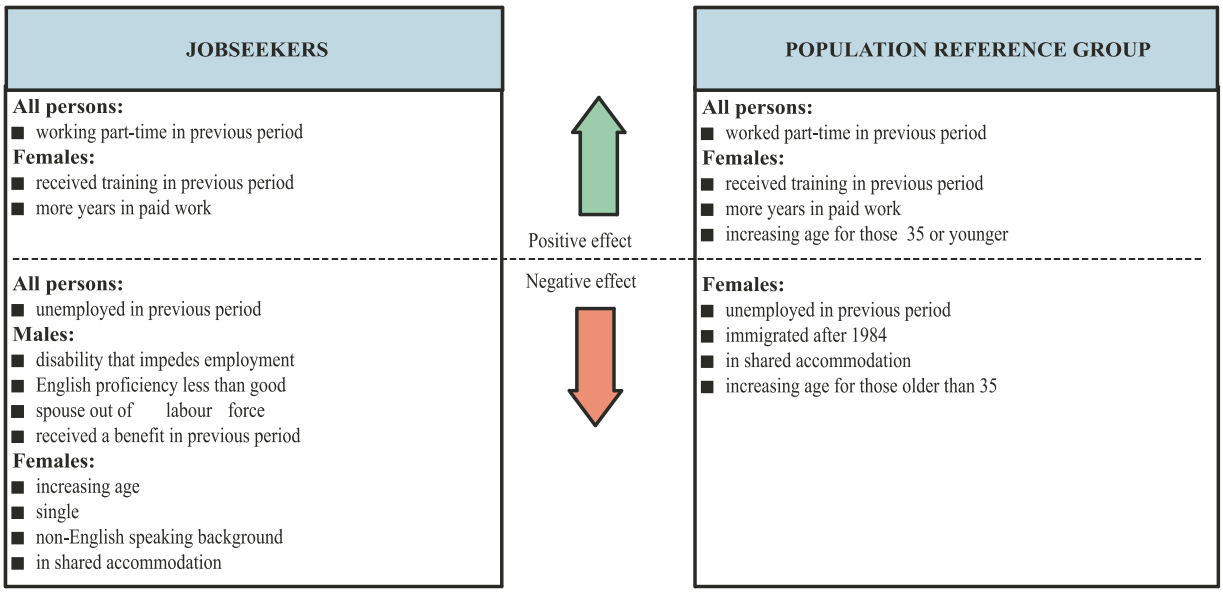


Chart 4.4 Characteristics affecting full-time employment in September 1996

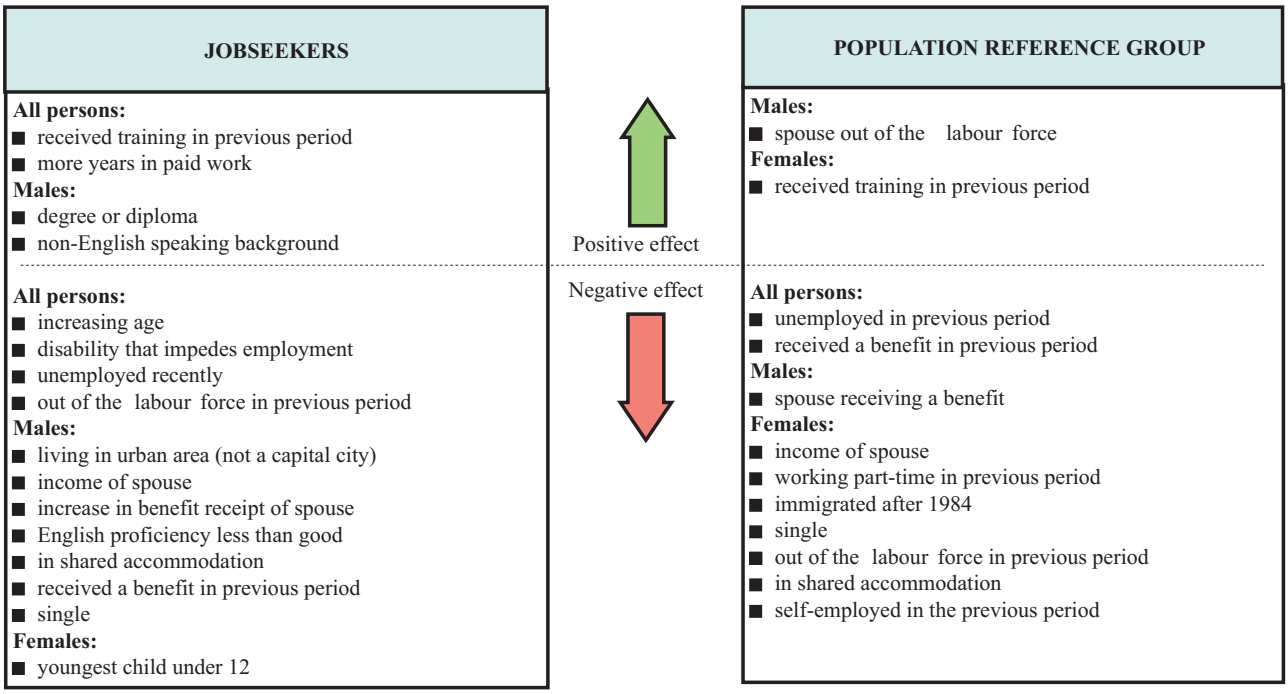
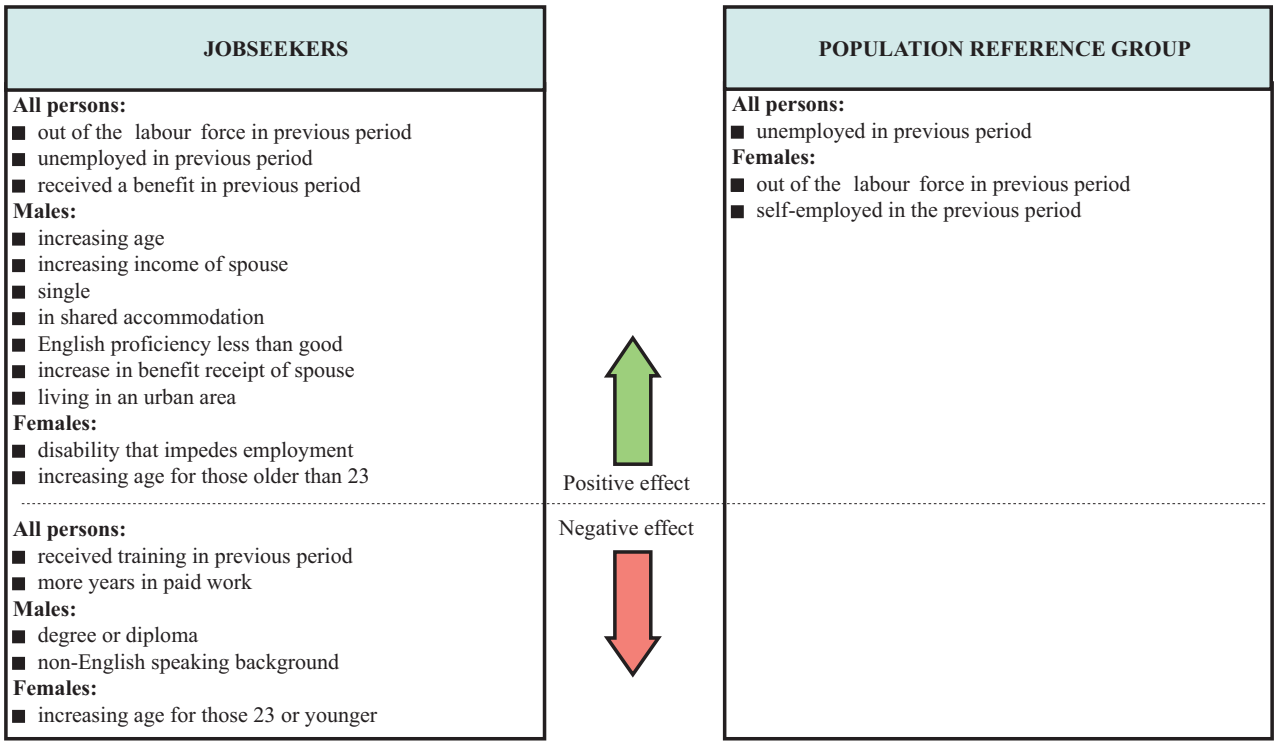


Chart 4.5 Characteristics affecting unemployment in September 1996



From these figures, it is clear that for the Population Reference Group fewer characteristics were significant than for the Jobseeker sample. This is partly due to the larger size of the Jobseeker sample and to an oversampling of unemployed people in the Jobseeker sample. In reporting the effect of each group of characteristics most of the discussion will, therefore, be on the Jobseeker sample.

Work history

There is a strong persistence in labour market state. For example, being unemployed in September 1995 will significantly increase your chances of being unemployed in September 1996. In addition to this inertia in labour market state, the following effects are observed - females from both groups who were unemployed in September 1995 and male Jobseekers who were unemployed in September 1995 were more likely to be out of the labour force in September 1996. This is indicative of a discouraged worker effect, i.e. those who have been unemployed for a long period may end up out of the labour force even though there is a desire to work.

For females from the Population Reference Group, those who worked part-time in September 1995 are less likely to be in full-time employment in September 1996. This effect could be explained by the preference of many females to work part-time because of family and home commitments. This effect is also significant at the 10% level for male Jobseekers, although it is much smaller than the negative effects that unemployment and being out of the labour force have on employment. Compared to other females from the Population Reference Group, previously self-employed females are also less likely to be in full-time employment and more likely to be unemployed.

Male Jobseekers who were previously unemployed were more likely than other male Jobseekers to be self-employed in September 1996. Although this effect is much smaller than the effect of previous self-employment and is based on a limited sample it still is an interesting result, since it seems to indicate that some unemployed males might try to become independent from benefits through self-employment. This link between unemployment and self-employment has been explored by other researchers. Bryson and White (1996) analysed exit rates of unemployed people to different labour market states in the United Kingdom and found that previous self-employment (before the unemployment spell) increased the probability of exit to self-employment. Eardley and Bradbury (1997) and Covick (1996) discuss the theory that self-employment increasingly represents disguised unemployment and grows in times of higher unemployment.

Being out of the labour force in September 1995 decreases the likelihood of working full-time and increases the likelihood of being unemployed in September 1996 (except for males from the Population Reference Group).

It should be noted however that the effect on part-time work is not significant. This indicates that making the step from being out of the labour force to part-time work is more likely than making the step to full-time work. For Jobseekers the effect of being out of the labour force on employment was particularly pronounced. Being out of the labour force in September 1995 decreased the probability of full-time work in September 1996 more than being unemployed did.

Males from the Population Reference Group who had been out of the labour force in September 1995 are more likely to be self-employed in September 1996 than those who had been in full-time work. The reasons for this behaviour are possibly similar to those of male Jobseekers who were previously unemployed.

Benefit receipt

Jobseekers who received benefits in September 1995 are more likely to be unemployed in September 1996 than other Jobseekers. Females from the Population Reference Group and males from both groups were less likely to work full-time and male Jobseekers who had received benefits were less likely to work part-time. These results indicate that re-entering the labour market is less likely if people have received benefits. This can be explained by the fact that benefit receipt normally originates from an inability to provide for one's own income. This inability may result from illness, disability, responsibility for the care of other people or because no employment can be obtained. These impediments to employment are likely to affect people for a relatively long period of time.

Income of the spouse

An increase in the spouse's wage income has a negative effect on full-time employment for females from the Population Reference Group and for male Jobseekers. It also makes male Jobseekers more likely to be unemployed, whereas female Jobseekers are less likely to be self-employed. One possible explanation is that if a spouse earns more there is less financial necessity to work full-time—particularly in the case of females with children. Alternatively, people may become more selective in choosing a job, when their partner has a higher income.

The effect of a spouse's benefit receipt is significant only for males. In the case of the Population Reference Group having a spouse who received benefits decreased the probability of working full-time for males. Whereas male Jobseekers were more likely to be unemployed and less likely to work full-time if their spouse started taking up benefits. This latter effect is probably more a result of unemployment rather than a cause. Since the introduction of individualised benefit payments, if the male becomes unemployed then his partner can become eligible to receive a benefit in her own right.

Labour market state of the spouse

The only spousal labour market state that seems to have a significant effect is being absent from the labour force. Males from the Population Reference Group were more likely to work full-time if their spouse was absent from the labour force, whereas male Jobseekers were less likely to be self-employed. One explanation for the latter effect might be that having a spouse in the labour force provides the financial security to become self-employed. Alternatively, the causal relation might be reversed, with self-employed males being helped by their spouses, since running one's own business is often a joint family effort. This would then imply that these females have to be in the labour force.

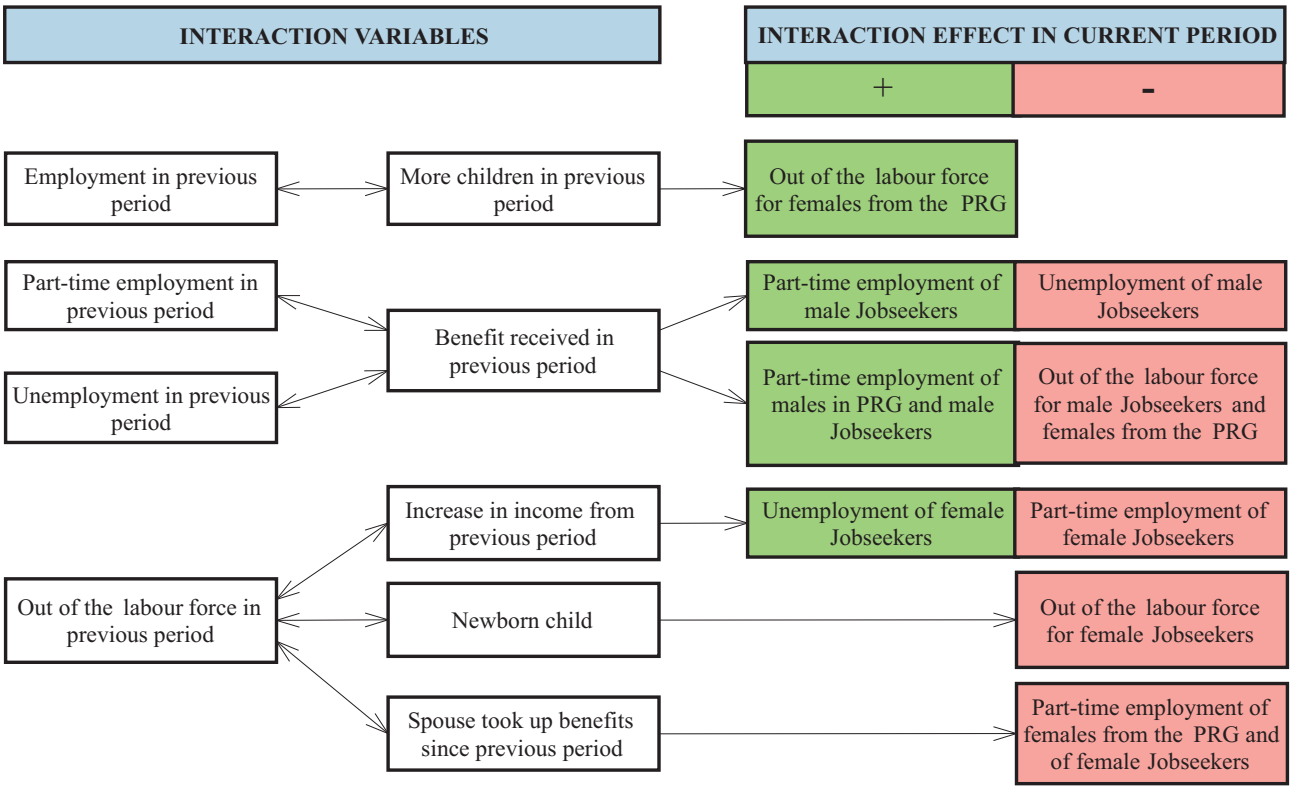
For male Jobseekers, a decrease in the labour supply of the spouse has a positive effect on being out of the labour force. This might indicate that couples value spending time out of the labour force together.

Interaction effects

Before continuing with personal and household characteristics the significant interaction effects will be discussed. An interaction variable combines information from two or more single variables. Interaction variables are important when the joint effect of having two characteristics is not equal to the sum of the separate effects of each characteristic. For example, in some cases each characteristic can have a negative effect, while the combined effect of having both characteristics is positive. This means that some characteristics are allowed to have a different effect in separate subgroups. This can only be represented by a model that includes the single variables and the interaction variable. In this section, those interaction variables that have a significant coefficient at the 10% significance level are discussed (see chart 4.6). All interaction effects presented here are a combination of previous labour market state and another variable.

On its own, receipt of benefits in September 1995 does not have a significant effect on labour force participation in September 1996 for females from the Population Reference Group. However, as chart 4.6 shows, when interacted with unemployment in September 1995 it decreased the probability of leaving the labour force. This negative interaction effect is larger than the positive effect of being unemployed in September 1995. As a result, unemployed females who received benefits were no more likely to leave the labour force than other females, whereas unemployed females who did not receive benefits were more likely to leave the labour force. A similar result is observed for male Jobseekers.

Chart 4.6 Interaction effects on labour market state



Interaction effects continued

For male Jobseekers, the same interaction variable also has a positive effect on part-time work, thus lessening the joint impact of benefit receipt and unemployment. The estimation results indicate that previously unemployed males who were receiving benefits are more likely to be in part-time work in September 1996 than males who were only unemployed or males who were only receiving benefit payments. At the 10% significance level, a similar effect is observed for the interaction variable of benefit receipt and part-time employment at the end of the previous period. Here the overall effect is positive. These results indicate that there are incentives to take up part-time jobs for benefit recipients.

A significant (at the 10% level) interaction variable in the unemployment model for male Jobseekers is benefit receipt in September 1995 combined with part-time work in September 1995. This coefficient is negative, lessening the positive joint effect. Thus, benefit recipients who worked part-time are less likely to become unemployed in the next period than other benefit recipients.

Interaction effects continued

In contrast with the Population Reference Group, the interaction term of benefits in September 1995 and being unemployed in September 1995 is not significant for female Jobseekers. For them, the combination of a newborn child and being out of the labour force in September 1995 has a significant negative influence on the probability of being out of the labour force. In other words, just adding together the two separate effects from having a newborn child and being out of the labour force in September 1995 would overestimate the joint effect of these variables.

A change in their spouse's benefit receipt between September 1995 and September 1996 interacted with being out of the labour force in September 1995 has a significant negative effect at the 10% level on the probability of working part-time for females from the Population Reference Group. The separate effects are both insignificant. Thus, females who were already in the labour force are not particularly affected by their spouse's benefit receipt, but for females out of the labour force there seems to be an extra disincentive to enter. In research by Bradbury (1995), there was no evidence of declining employment rates for females whose partner became unemployed either.

Two interaction terms have a significant effect at the 10% level on the probability of part-time work for female Jobseekers. First, an increase in spousal income combined with their own business and property income over the past year, interacted with being out of the labour force in September 1995 has a negative effect on the probability of working part-time. The joint effect of this change in income and previously being out of the labour force has a larger negative effect than the sum of the effects of each variable separately. Second, a change in benefit receipt status of the spouse (from no benefits to benefit receipt) and being out of the labour force in September 1995 have a similar negative effect on part-time work. This latter effect might indicate there is a disincentive for females to enter the labour market after their spouse starts receiving benefit payments.

Finally, the interaction of an increase in spousal income combined with their own business and property income, interacted with being out of the labour force in September 1995 has a positive effect on the probability of being unemployed.

Age

Where the age effect is present, its direction is as one would expect. That is, with increasing age, Jobseekers and people from the Population Reference Group are less likely to work and more likely to be out of the labour force and unemployed. However, it is interesting (and slightly surprising) to find that the likelihood of being out of the labour force is only affected by age for female Jobseekers. A possible reason for this is that everyone in the sample was between 15 and 59 years of age at the time of recruitment, which is perhaps too young for most males to consider retirement.

Disability

As expected, those with a disability that impedes employment are affected more widely than those with less serious disabilities. In all groups, except for males from the Population Reference Group, these people are more likely to be out of the labour force. In addition, female Jobseekers are also more likely to be unemployed.

Education and training

Having tertiary qualifications is reasonably effective in improving people's labour market prospects. Females from both groups were less likely to be out of the labour force and male Jobseekers were less likely to be unemployed and more likely to work full-time.

For both groups, those who only finished secondary school or had a skilled or unskilled vocational qualification had little advantage in terms of labour market state over those who did not finish secondary school. The only significant effect of this level of education is observed for females from the Population Reference Group—they were less likely to be out of the labour force than less well educated females.

There are other examples in the literature where only small or no effects from education level are observed. For example, Stromback et al. (1998) found education had little effect on the transition probabilities of working to looking for work, looking for work to working and being absent from the labour market to working. Le and Miller (1999) found that education level had no effect on the probability of unemployment after including lagged labour market variables. In Van den Berg and Ridder (1998), the level of education seems to have little effect on unemployment duration and only the higher education levels affect the employment duration. Gorter and Kalb (1996) found little evidence overall for the effect of education on the job finding rate (only medium vocational seems to affect this rate). Finally, Shaw (1994) found that the probability of employment only depends significantly on the education level for some age groups.

Having had training in the previous period increases the probability of being in full-time employment for all groups, except for males from the Population Reference Group. Training also had the effect of increasing participation in part-time work and decreased the probability of being out of the labour force for females from both groups. In addition, it decreased the probability of being unemployed for all Jobseekers. A possible explanation for all these effects might be that training is provided to those with the strongest attachment to the labour force and to those in the more secure jobs, so the investment will pay off for the employer.

English proficiency

Among female Jobseekers, those from a non-English speaking background are less likely to work part-time, whereas among male Jobseekers, those from a non-English speaking background are less likely to be unemployed and more likely to be working full-time and part-time. However, the male Jobseeker's proficiency in English has to be at least 'good', otherwise there is a negative effect on the probability of part-time and full-time employment and a positive effect on unemployment. An explanation for the result found here is that often people from a non-English speaking background are first-generation immigrants who have been selected by immigration officials on their skills.[2] Because of this selection procedure, people in this group are less likely to be unemployed for a long period of time. Stromback et al. (1998) and Le and Miller (1999) found no variables relating to English language skills that are significant at the 1% or 5% level.

Females from the Population Reference Group, whose English proficiency is less than 'good', are also less likely to work part-time or full-time than other females from the Population Reference Group.

Year of arrival for immigrants is less relevant than English proficiency. The only significant effect was found for male Jobseekers, where those who arrived in Australia after 1984 appear more likely to become self-employed. This might be because it is more difficult for recent migrants to find work as employees.

Children

The labour market state for males is not affected by the age or number of children. For females from both groups, the number of children also did not have any significant effect on labour market state, although the age of the children did. A newborn child increases the probability of being out of the labour force for females. Female Jobseekers are also less likely to participate in the labour market if their youngest child is younger than twelve years old and even if they do participate, they are less likely to work full-time. These results are similar to what is found in other studies, except that children between 0 and 5 years old have a smaller effect on labour market participation than children between 6 and 12 years old.

For females, the labour force participation models also include the number of children in the household at the end of the previous period plus an interaction variable of number of children in the household at the end of the previous period combined with an indicator of part-time or full-time employment at the end of the previous period. It was anticipated that this would reveal a stronger negative effect on being out of the labour force for females with children who worked in the previous year than for other females. The hypothesis was that females with

2 An important skill would be English proficiency, but in addition, people with occupations and skills that are scarce in Australia get priority.

Children continued

children and in employment must have a strong (unobservable) motivation to work (Nakamurra and Nakamurra, 1994). According to the results, this does not seem to occur. The coefficient on the interaction term seems to be positive rather than negative although it is clearly not significant for the Jobseekers and only significant at the 10% level for the Population Reference Group. Interestingly, the coefficients on the number of children at the end of the previous period are negative in both samples and significant at the 5% level for female Jobseekers. Thus, if you had a larger number of children at the end of the previous period you are more likely to be in the labour force now. It is possible that a larger number of children identifies the families that are complete, that is, they will not have additional children. Females in these families are therefore perhaps more likely to re-enter the work force.

Household type

Single[3] females from the Population Reference Group were more likely to be in the labour force, but less likely to work full-time than other females from the Population Reference Group. Their peers in the Jobseeker group were less likely to be self-employed or to work part-time. Single male Jobseekers were more likely to be unemployed. Those sharing accommodation[4] had similar effects.

From the above results, it appears that those who are single or share accommodation are disadvantaged in the labour market. However, the direction of causality may be reversed, i.e. people may be sharing accommodation because they are not successful in the labour market and cannot afford the costs of living alone. In addition, single people and people sharing accommodation tend to be younger and are therefore more likely to be new to the labour market.

Geographical location

According to the models, the degree of urbanisation has little effect on labour market state. For females from the Population Reference Group, those from rural areas are more likely to participate in the labour force. Among male Jobseekers those from urban centres outside the capital cities are more likely to be unemployed and less likely to work full-time. Stromback et al. (1998) found no effect from the degree of urbanisation on the transition probabilities of working to looking for work, looking for work to working, and being absent from the labour market to working; Le and Miller (1999) found no effect on the probability of unemployment.

Some of the coefficients for State of residency are significant, but there does not seem to be a particular pattern of effects.

3 Single people also include sole parents who live on their own with their children.

4 People sharing accommodation includes everyone who shares a flat or house with people other than a spouse or de facto and independent children who live with their parents.

Comparison with another SEUP analysis

Le and Miller (1999) have also analysed the SEUP data. It is difficult to compare the results of their analysis of the unemployment probability with the results from this study. First, the population analysed here is subdivided into males and females and second, different variables are included. Notwithstanding these differences, Le and Miller analysed the Population Reference Group and found similar significant effects to those found here for the Jobseekers. In this study, the results in the Population Reference Group only show significant effects for labour market state in September 1995. However, for Jobseekers, age, being single, having a handicap that impedes employment, and previous unemployment are variables that have similar effects as comparable variables in Le and Miller's analysis.

CHARACTERISTICS AFFECTING BENEFIT RECEIPT

Using the models discussed above, benefit receipt is estimated simultaneously with labour market state for three estimation groups. The groups are: all people in the sample, all people in the sample who are in the labour force, and all people in the sample who are in the labour force and not self-employed.

Chart 4.7 summarises the variables that have a significant effect on benefit receipt. As can be seen, the only significant effect for the Population Reference Group is the persistence of Benefit receipt—i.e. the receipt of a benefit in September 1995 increases the likelihood of benefit receipt in September 1996 for all three estimation groups. Jobseekers, however, have a wide range of other characteristics that influence benefit receipt and are the focus of this discussion.

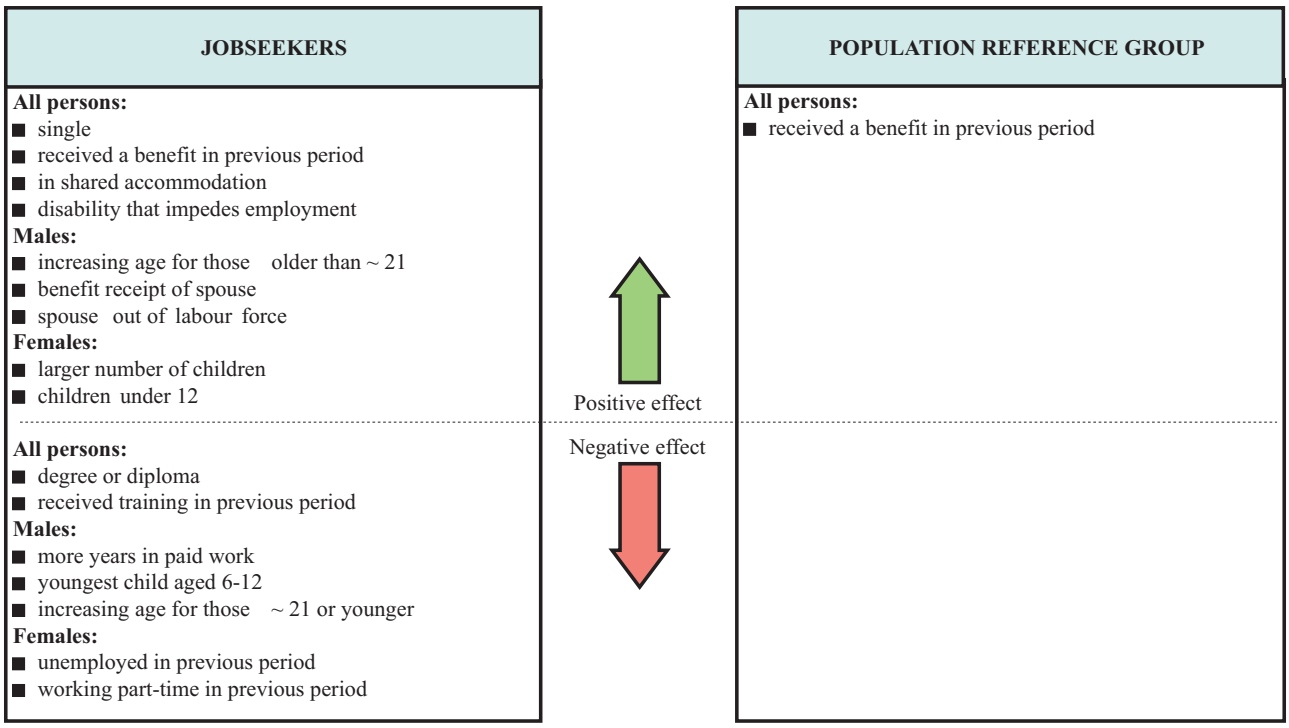
Work history

More years of work experience decreased the likelihood of receiving benefits for male Jobseekers from all three estimation groups. A longer work history means that people have had more time to save and acquire assets. As a result, they will be less likely to be in need of benefits than those at the start of their working life.

Female Jobseekers in general and female Jobseekers in the labour force who had a part-time job in September 1995 are also less likely to receive benefits than other female Jobseekers. In the latter case, a possible explanation is that a female working part-time in September 1995 instead of full-time is more likely to come from a two-income household, thereby reducing the risk of becoming dependent on benefits.

Finally (and surprisingly), female Jobseekers in the labour force are less likely to receive benefits than other female Jobseekers if they were unemployed in September 1995.

Chart 4.7 Characteristics affecting benefit receipt in September 1996



Spousal income

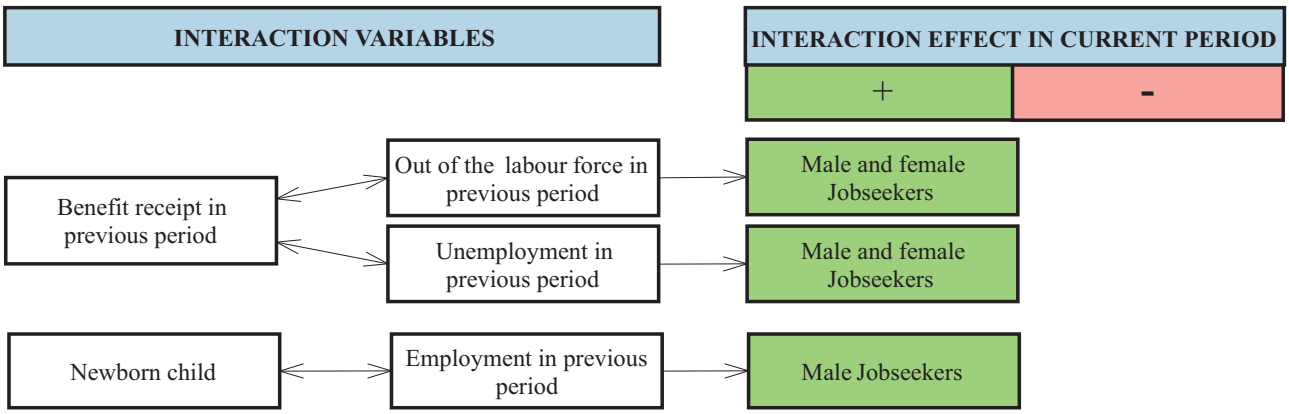
Having a spouse who received benefits increased the likelihood of receiving benefits for male Jobseekers in the labour force and male Jobseekers in general. This possibly results from the individualisation of unemployment benefits, where each spouse receives half of the benefit payment.

Spousal labour market state

Having a spouse who is absent from the labour force made it more likely for a male Jobseeker in the labour force (including and excluding self-employed) to receive benefits. This is not surprising, since female participation would make it less likely for the household to be eligible for benefits.

Chart 4.8 summarises the significant interaction effects in the benefit receipt equation. For female Jobseekers, there is a nearly significant positive effect for the interaction variable of benefit receipt and being out of the labour force in September 1995. Being out of the labour force in September 1995 reinforces the effect of previous benefit receipt on current benefit receipt, although the variable being out of the labour force on its own has virtually no effect.

Chart 4.8 Interaction effects on benefit receipt



Spousal labour market state
continued

The interaction variable of benefit receipt in September 1995 and unemployment in September 1995 has a positive effect on benefit receipt for male Jobseekers. A similar nearly significant effect is observed for the interaction variable of benefit receipt in September 1995 and being out of the labour force in September 1995. The joint positive effect is larger than the sum of the separate effects. Thus, people who were working and receiving a benefit are relatively less likely than non-working benefit recipients to still receive a benefit. A similar effect was found by Warburton et al (1999).

Age

Age shows a similar effect for all estimation groups amongst male Jobseekers. The probability of receiving a benefit decreases with age until a minimum is reached after which the probability increases with age. The minimum is reached at 23 years of age for all males in the sample, at 24 years of age for all males in the labour force, and at 20 years of age for all males in the labour force excluding the self-employed.

Disability

Not surprisingly, a disability that impedes employment has the effect of increasing the probability of benefit receipt for all female Jobseekers in general and for male Jobseekers from all three estimation groups.

Education and training

For male and female Jobseekers from all estimation groups, the effect of training in the previous period is to decrease the likelihood of receiving benefits in September 1996. This could be either because training helps people keep a job or find a new job or because more secure jobs are more likely to offer training. The latter would mean training is an indicator of a particular type of job.

Having a vocational or secondary school qualification has no effect on benefit receipt. However, having higher educational qualifications reduces the chance of receiving benefits for female Jobseekers in the labour force who are not self-employed and for female Jobseekers in general. Education has a similar effect for male Jobseekers in the labour force (including and excluding self-employed).

Children

The presence of children increased the likelihood of benefit receipt for female Jobseekers to a much larger extent than for male Jobseekers. The higher proportion of females who are sole parents (and as a result on a sole parent pension) could account for this large difference.

Household type

Single Jobseekers and Jobseekers who share accommodation seem consistently more likely to receive benefits. Cause and result are hard to disentangle. On the one hand, people who live alone or share with others may be at a certain stage in their life, which makes them more likely to need income support (for example, a recent separation). On the other hand, sharing accommodation may be a way to budget, which is necessary because of a dependence on benefit payments.

Variables not affecting benefit receipt

None of the variables associated with the skill to speak, read or write English had a significant effect on the probability of receiving benefits. Neither did geographical location. Surprisingly, the amount of own business and property income appeared not to affect benefit receipt either.

CORRELATION BETWEEN BENEFIT RECEIPT AND LABOUR MARKET STATE

Absence from the labour force

For male and female Jobseekers, the correlation coefficient between being out of the labour force and benefit receipt is small but significant—0.34 and 0.21 respectively. This indicates that they were slightly more likely to receive benefits when they were out of the labour force, even after controlling for all the included independent variables. The fact that they have been looking for work at some stage during the survey, therefore, may have indicated the necessity of earning some additional income. For the Population Reference Group, the results were similar in magnitude but were not statistically significant.

Self-employment

One might expect a negative correlation between self-employment and benefit receipt, because the image of self-employment is often one of independence and a desire to avoid benefits. In fact the correlation coefficients are insignificant for all groups and vary widely in size and sign (from -0.16 to 1.00). This volatility reflects the small size of the group and prevents us from drawing any meaningful conclusion.

Unemployment

For male and female Jobseekers, the correlation coefficient between unemployment and benefit receipt is significant and positive—0.67 for males and 0.60 for females. However, it is not as high as for the Population Reference Group—the corresponding correlation coefficients were 0.95 and 0.81. This indicates that, relative to the Population Reference Group, either more unemployed Jobseekers did not receive benefits or more employed Jobseekers received benefits. Looking at tables 3.7 and 3.8 it can be seen that it is the latter situation that prevails—a larger percentage of Jobseekers were receiving unemployment benefits while self-employed, working part-time or working full-time. These results reflect a labour market where Jobseekers are over-represented in lower quality jobs that do not provide sufficient income to become independent of benefit payments. An alternative or additional explanation is that more of the variation amongst Jobseekers is already explained by the independent variables.

Summary

Summarising the above, it is clear that a strong correlation exists between being unemployed and receiving benefit payments for both men and women. The correlation is higher for the Population Reference Group than for Jobseekers. Being out of the labour force and receiving benefit payments is correlated to a much smaller extent, especially for women. This low correlation for women is possibly because some women choose to stay at home and have the spouse provide the income. Thus, they are less likely to be dependent on benefit payments while absent from the labour force.

SECTION 5 ANALYSIS OF UNEMPLOYMENT

In this section, use is made of the continuous nature of the data to assess who is at risk of long-term unemployment and what were the effects of the July 1995 changes to income support policy on unemployment duration.

METHODOLOGY

Unemployment spells are analysed using a proportional hazard rate model with a Weibull specification for the time dependence (see section 2). Table 5.1 presents the results of this model separately for people from the Population Reference Group and Jobseekers. From the constant, it can be inferred that Jobseekers generally have longer unemployment spells.

Defining the dependent variable

The dependent variable is the duration (in days) of the censored or uncensored unemployment spell. Each spell is treated as a separate observation, although some of these spells may belong to the same respondent. However, to explain the duration of a spell, information on the number and duration of previous spells by the same person is included. To ensure an observation period of at least 60 days, spells were only analysed if they started before 4 July 1996.[1]

The unemployment spell is considered completed if the respondent exits to either part-time, full-time or self-employment,[2] even if the respondent still receives unemployment benefits. Because it is re-employment rates that are of interest, if the respondent leaves the labour force then the observed duration until exit from unemployment is considered to be a censored observation. Unemployment spells that are continuing after the observation period has finished are also censored.

The independent variables

Independent variables in the analyses are personal and household characteristics, the respondent's work history, location of residency, income, characteristics of the spouse and benefit receipt information.

1 Without this condition, people starting unemployment just before the end of the observation period will have very short censored spells. Imposing this condition guarantees a minimum observation period, although the length of the period is quite arbitrary.

2 Currently, the model only allows for an exit destination of employment. At a later stage, the model could be extended to allow for different exit destinations. For example, a model with separate exit rates to part-time, full-time and self-employment could be estimated.

5.1 HAZARD RATE ANALYSIS OF UNEMPLOYMENT SPELLS

	Population Reference group		*Jobseekers*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	5.649	5.14	5.904	18.98
Personal characteristics				
Male	–0.031	–0.14	0.120	2.17
Female in special group	—	—	1.246	1.71
Age at start of employment/10	–0.806	–1.46	–0.338	–2.39
Age squared at start unemployment/100	0.149	2.08	0.102	5.44
Disabled	—	—	0.042	0.57
Disability that impedes employment	0.083	0.40	0.172	2.06
Skilled/unskilled vocational or finished secondary school	–0.105	–0.60	–0.123	–2.66
Degree or diploma	–0.268	–0.93	–0.355	–4.85
Training in previous period	–0.335	–1.98	–0.216	–4.90
Non-English background speaker	0.251	0.85	0.197	2.20
Immigrated after 1984	0.437	1.18	0.181	1.76
English proficiency less than good	–0.834	–1.56	0.009	0.06
Writing proficiency less than good	1.935	1.78	–0.358	–1.39
Reading proficiency less than good	–3.494	–3.82	0.456	1.78
Speaking proficiency less than good	2.296	2.01	0.136	0.61
Aboriginal or Torres Strait Islander	0.393	0.88	0.338	2.47
Household characteristics				
Number of children	0.103	0.83	0.020	0.56
Age youngest child 0–5	–0.223	–0.54	–0.174	–1.59
Age youngest child 6–12	–0.237	–0.47	–0.222	–1.80
Single	0.541	1.06	0.166	1.20
Sharing accommodation with others	0.043	0.09	0.166	1.20
Female* youngest child 0–5	1.029	2.49	0.602	5.02
Female* youngest child 6–12	0.597	1.08	0.724	4.95
Work history				
No. of previous employment spells	–0.073	–0.63	–0.260	–14.02
Duration of previous unemployment spells/1000	0.334	1.50	0.244	5.55
Duration of recent work experience/100	–0.011	–1.63	–0.118	–5.86
No. of years in paid work/10	–0.044	–0.21	–0.364	–6.74
No. of years looking for paid work/10	0.148	3.70	0.397	3.85
Geographical location				
Urban centre (not capital city)	–0.608	–2.84	–0.056	–1.10
Rural area	–0.388	–1.64	–0.158	–2.47
Victoria	–0.608	–1.86	–0.142	–1.54
Queensland and Northern Territory	–0.697	–2.23	–0.209	–2.16
South Australia	–0.630	–1.62	–0.114	–0.99
Western Australia	–0.718	–2.64	–0.235	–2.87
Tasmania	–0.190	–0.46	–0.251	–2.15
Australian Capital Territory	0.035	0.06	–0.157	–1.27
Ratio of job vacancies & unemployment	–1.264	–0.32	–2.116	–1.68
Income variables				
Log (own income of business/property)/10	–0.244	–2.08	–0.031	–0.89
Benefit receipt	0.195	0.40	1.204	4.75
Unemployment benefit receipt	1.434	3.71	–0.510	–1.98
Spouse characteristics				
Log (income of spouse)/10	0.111	0.52	0.071	1.21
Spouse out of labour force	–0.500	–1.33	0.237	2.62
Spouse unemployed	1.112	2.43	0.094	0.88
Spouse working part-time	–0.168	–0.45	0.266	2.36

For footnotes see end of table. ...continued

5.1 HAZARD RATE ANALYSIS OF UNEMPLOYMENT SPELLS—*continued*

	Population Reference group		*Jobseekers*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
After 1 July 1995	–0.088	–0.46	–0.342	–5.10
Interaction variables				
Unemployment benefit* after 1 July 1995	—	—	0.823	2.96
Benefit receipt* after 1 July 1995	–0.304	–0.74	–0.805	–2.93
Females in special group* after 1 July 1995	—	—	–0.908	–1.16
Duration dependence(a)	1.208	0.115	1.019	0.028
Heterogeneity parameter	0.854	3.40	0.325	5.41
No. of observations	429		4287	
Log likelihood function	–1 811.7		–19 810.4	

(a) For duration dependence the question is whether the coefficient significantly differs from 1 (not from 0), therefore the standard deviation is given instead of the t-statistic.

The independent variables continued

To analyse the combined effect of the changes to income support policy introduced in July 1995, a dummy variable 'After July 1995' to indicate the period after 1 July 1995 is included as an explanatory variable. This dummy variable is also interacted with other variables to examine whether different groups may have been affected differently and to separate the time trend effect. Since it is the duration of unemployment spells before and after July 1995 that are being compared, unemployment spells that started before September 1994 (the start of the survey period) are excluded. These spells would tend to be considerably longer and could distort the estimated effect of the July 1995 changes.

In the following subsection, the significant variables from the table are discussed.

RESULTS FOR JOBSEEKERS

Personal and household characteristics

The number of unemployment spells occurring in the first two years of the survey is much larger for the Jobseeker group than for the Population Reference Group, consequently several more characteristics were significant in this sample.

Age and gender has an impact on unemployment duration. The length of unemployment spells increased with age and males have longer unemployment spells than females. Females with a child below 12 years of age have longer unemployment spells than other females. Assuming that these women are genuinely looking for work (i.e. are available to start work), this indicates that employers are less likely to hire a female with younger children or that females with children need to be more selective about the jobs they select because it must fit in with their family commitments. Higher education levels and training in the previous period decrease the length of unemployment spells.

Work history

An increase in the number of previous unemployment spells tended to decrease the expected unemployment duration, this is opposite to the expected effect. Because the data is only drawn from a two year period, one possible explanation is that a large number of unemployment spells within this period could be indicative of a pattern of short spells of unemployment and employment. The persistence of this pattern would increase the likelihood of another short spell of unemployment being observed.

The duration of previous employment and unemployment spells had the expected effect. The total duration of the previous unemployment spells (within the survey period) and the number of years the respondent had been looking for work since leaving school increased the expected duration of unemployment. The opposite effect was found for the duration of recent work experience (within the survey period) and the number of years the respondent had been in paid work since leaving school.

Geographical location

Although one would expect employment prospects to be better in capital cities and urban areas, the results indicate that Jobseekers in rural areas have shorter unemployment spells.

Jobseekers from areas with a higher 'vacancy-to-unemployment'[3] ratio also had shorter unemployment spells though this effect was only significant at the 10% level.

Benefit receipt and spouses' labour market state

Overall, benefit receipt seemed to increase the expected duration of the unemployment spell, however this increase appeared to be smaller for respondents who received unemployment benefits.

If the spouse was out of the labour force or was working part-time, the expected duration of unemployment was longer, whereas, surprisingly, an unemployed spouse had no effect on the duration of unemployment.

3 This variable is constructed by using ABS information on quarterly job vacancy and unemployment numbers for each State (Cat. no. 6354.0 and Cat. no. 6203.0) and is used to represent the state of the labour market at the time of becoming unemployed. The value of this variable at the start of the unemployment spell was used to explain the duration of the spell, it was not used as a time-varying variable, since the LimDep package is restricted in the number of variables and observations it can deal with. Introducing time-varying variables multiplies the number of records in the data set and it will quickly increase the number of cells in use beyond the allowed number.

From table 5.1 it can be seen from the coefficient of the dummy variable 'After 1 July 1995' that unemployment spells that completely or partly occurred in the period after July 1995 tended to be shorter in duration. This effect was particularly evident for those on benefits, as can be seen from the interaction term of Benefit Receipt and 'After 1 July 1995'. Including this interaction term means that the variable 'After 1 July 1995' accounts for other unobserved events (e.g. labour market changes) which occurred around the same time, but which are unrelated to the income support policy changes.

However, the interaction variable of the 'after 1 July 1995' dummy and the receipt of unemployment benefits seems to have a lengthening effect on duration. The opposite effects of this and the previous interaction term are very close in magnitude, cancelling out each other nearly exactly. This result indicates that the policy changes might have had different effects for different groups. That is, the shortening effect of the policy changes on unemployment duration seems valid only for people with benefits other than unemployment benefits. At a later stage more in-depth research could focus on this issue.

One explanation for the absence of a larger effect for those on unemployment benefits is that a new group of people with less attachment to the labour force were receiving unemployment benefits after the changes of July 1995. Some partners of unemployed people (mostly females), not previously receiving unemployment benefits on their own account were now receiving unemployment benefits and had to be available for work. Therefore, an additional group was included in an interaction term: women in couples who were under 40 on 1 July 1995 without young children and in receipt of unemployment benefits, partner or parental allowances. For many of these women the policy changes of July 1995 meant that in order to qualify for benefits they (as well as their partners) had to be available for work. The estimated effect is a decrease in unemployment duration, but this effect is clearly insignificant, due to the small number of people meeting the criteria. In addition, the labour market state at two fixed points in time, (before and after the change) was examined, for the relevant women, again the problem is that even in the Jobseeker sample, the number of females in this category is very small. Therefore, no conclusions for this particular subgroup could be drawn based on this data.

Duration dependence

After taking into account unobserved heterogeneity, which results in a significant coefficient in this model, there does not seem to be a significant duration dependence,[4] the probability of exit from unemployment at a point in time is independent from the time spent in unemployment so far. Chapman and Smith (1993) found a similar result for data on young Australians, but the result is contradictory to some other Australian results, who have found a 'scarring' effect of unemployment (Brooks and Volker, 1986, and Stromback, Dockery and Ying,1998). However, Brooks and Volker's study only included a small number of explanatory variables and did not account for unobserved heterogeneity. This could potentially bias downward the estimated parameter for duration dependence.[5] Stromback, Dockery and Ying's study also did not account for unobserved heterogeneity and had a different treatment of spells—this study analysed the duration of spells of looking for work while not working, whereas their study analysed the duration of "looking for work" spells. Also in this study, spells were only counted as completed when someone found a job; in their study a spell was also counted as complete if somebody left the labour force.

Although no duration dependence is found within the current spell, longer previous unemployment spells tend to decrease the probability of exit from the current unemployment spell. Thus an opposing effect is observed for current unemployment duration and unemployment duration in previous spells. These different effects may be partly because the duration of current unemployment spells were potentially much shorter than the duration of previous unemployment spells causing the scarring effect of current unemployment to be weaker and the effect of previous unemployment spells to dominate.

4 That is, the duration dependence parameter plus or minus two times its estimated standard deviation includes one in the obtained interval (see table 5.1) and is therefore not significantly different from one at the 5% level.

5 Studies with fewer variables and without an unobserved heterogeneity parameter may have interpreted the longer durations of disadvantaged unemployed people as duration dependence, whereas it should have been interpreted as the effect of the most disadvantaged remaining unemployed for the longest time. That is, at the start of the unemployment spell, exit rates are high because people who have high exit rates are still part of the group of unemployed. However, after some time these more advantaged unemployed will have exited, leaving behind the most disadvantaged persons. Consequently, the exit rate of this remaining group will be lower. Thus a decrease in the average exit rate over time is not necessarily the result of elapsed time but could also reflect the fact that more disadvantaged people (who had low exit rates from the start of the unemployment spell) remain behind in unemployment. Therefore, inclusion of as many variables measuring this potential disadvantage and accounting for unobserved heterogeneity are important to enable separation of the "elapsed time" effect from the effect of the most disadvantaged remaining behind.

Duration dependence continued

Another explanation for this counterintuitive effect of no duration dependence may be the presence of Labour Market Programs, especially targeted at long-term unemployed which aims at taking people out of unemployment and into training and work experience programs. If these programs are successful they would counteract a negative duration dependence. This hypothesis could be tested by introducing different exit destinations from unemployment, so that exit because of Labour Market Program participation can be distinguished from exits because of finding employment. However this is outside the scope of the paper.

RESULTS FOR THE POPULATION REFERENCE GROUP

Personal characteristics

For the Population Reference Group the expected duration of unemployment increases with age. People who received training in the period before unemployment have shorter spells than others. Respondents who have a speaking proficiency that is considered to be less than good have longer spells than others, while people with a reading proficiency that is categorised to be less than good have shorter unemployment spells. The latter result seems rather surprising and contradictory. However, it should be noted that there are very few people who fall into this category and that the result is not repeated in the Jobseeker group. Females with children under five years old are more likely to have a long unemployment spell. Of the work history variables, only the long-term variable representing the number of years the respondent has been looking for work since leaving school has the effect of increasing the expected unemployment duration.

Geographical location

Although one would expect employment prospects to be best in capital cities, the results indicate that living in urban centres outside the capital cities has the effect of decreasing unemployment duration. Also living in a rural area has a similar but smaller and insignificant effect on decreasing employment duration.

Income and benefit receipt

Respondents with higher income levels from business and property have shorter unemployment spells. These respondents might not need to work and perhaps they stop looking after a short time or as a result of their connections in the business world they have access to a network of people through which they can find a job more easily.

Income and benefit receipt continued

In contrast to Jobseekers, respondents who receive unemployment benefits seem to have longer spells of unemployment, whereas the receipt of other benefits does not seem to affect the duration of unemployment. People who have been on unemployment benefits for some time could have a hard time overcoming the stigma associated with longer-term unemployment. On the other hand the receipt of other benefits is caused by a temporary inability to work, which is unrelated to how employers perceive the person. Once the inability to work has ceased to exist and the person is again available to enter the labour force, it might be easier for them to find a job than for people on unemployment benefits (who have not left the labour force). In addition there is a selection issue as well. People on other benefits in principle do not have to look for work, therefore the ones on benefits that do want to work may be very motivated or have very high skills.

Compared to Jobseekers, another difference is that if the spouse is unemployed as well, then the unemployment spell of the respondent is likely to be longer. This correlation between spouses' unemployment has been observed and discussed in the literature (examples are Bradbury, 1995; King, Bradbury and McHugh, 1995; Bingley and Walker, 1997; and Dex et al., 1995). However, the findings on the causal direction of the relationship are quite diverse. Some researchers, particularly those who control for spouse characteristics (which has not been done here), find the opposite of what is found here.

Effect of July 1995 changes

The July 1995 changes to income support policy did not have a significant effect on unemployment duration for the Population Reference Group.

Duration dependence

Finally, the coefficient for duration dependence is not significantly different from one after controlling for unobserved heterogeneity. This means that the exit rate from unemployment is constant with respect to the time already spent in unemployment, indicating that there does not seem to be a 'scarring' effect for people who have been unemployed for a longer time. This result is similar to the constant duration dependence observed for Jobseekers. However, like for the Jobseekers, the number of years that someone has been looking for work since leaving full-time education has a significant positive effect on unemployment duration and thus this latter result seems to support the 'scarring' effect of unemployment.

SECTION 6 ANALYSIS OF EMPLOYMENT

With regard to labour market dynamics there are two types of spells that are of particular interest from a policy perspective, unemployment duration and the duration of the first employment spell after unemployment. The latter spell is important as it is a measure of whether the unemployed are finding steady work or are experiencing a stream of short 'dead-end' jobs. Short, but often repeated, unemployment spells may be just as undesirable as unemployment spells of a long duration.

In this section the final two labour market issues identified in section 1 are addressed—the characteristics that determine the duration of the first employment spell after unemployment and the characteristics contributing to a persistent cycle of short employment and unemployment spells.

METHODOLOGY

In analysing employment durations, a proportional hazard rate model with a Weibull specification for time dependence is again used. The variables used in the analysis are similar to those used in analysing unemployment durations. As a result, it is possible to compare the effects that characteristics have on the duration of unemployment spells with the effects that the same characteristics have on the duration of the following employment spell for those who were successful in finding work.

The definition of the dependent variable

The dependent variable in this analysis is the duration of the first employment spell after an unemployment spell. This duration is completed when the respondent moves out of the labour force or becomes unemployed again. The duration of an employment spell is extended if the respondent moves from one job to another without any days of unemployment in between, irrespective of whether this is part-time, full-time or self-employment. A duration is censored when the employment is continuing beyond the period of observation.

RESULTS FOR JOBSEEKERS

Personal characteristics

Table 6.1 reports the results on the analysis of employment spells. Looking at the constant term it seems that those in the Population Reference Group had longer employment spells than Jobseekers. Employment duration appears to peak for those aged about 36 years and males had shorter employment spells than females. Jobseekers who have a disability that impedes employment had shorter employment spells. Those from non-English speaking backgrounds had longer employment spells, which is an interesting result especially when compared with the longer unemployment spells within the Jobseeker sample. It indicates that people from a non-English speaking background may need more time to find a job, but once they have found one they are more likely to hold on to employment.

6.1 HAZARD RATE ANALYSIS OF EMPLOYMENT SPELLS AFTER UNEMPLOYMENT

	Population reference group		*Jobseekers*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	4.905	3.12	3.504	7.81
Personal characteristics				
Male	0.109	0.43	–0.193	–2.38
Female in special group	—	—	–0.592	–0.67
Age at start of employment/10	1.699	2.30	0.948	4.52
Age squared at start unemployment/100	–0.270	–2.71	–0.131	–4.77
Disabled	—	—	0.076	0.72
Disability that impedes employment	–0.646	–2.56	–0.422	–3.44
Skilled/unskilled vocational or finished secondary school	–0.047	–0.22	0.047	0.69
Degree or diploma	0.650	1.73	0.040	0.38
Training in previous period	–0.236	–1.10	0.104	1.63
Non-English background speaker	–0.305	–0.79	0.275	2.21
Immigrated after 1984	0.420	0.67	0.190	1.34
English proficiency less than good	0.838	1.05	–0.160	–0.74
Writing proficiency less than good	0.714	0.23	0.509	1.37
Reading proficiency less than good	–0.853	–0.28	–0.133	–0.33
Speaking proficiency less than good	–0.895	–0.55	–0.044	–0.15
Aboriginal or Torres Strait Islander	0.761	1.34	0.112	0.53
Household characteristics				
Number of children	0.017	0.07	0.003	0.05
Age youngest child 0–5	–0.556	–0.85	0.029	0.18
Age youngest child 6–12	–0.085	–0.10	0.213	1.24
Single	–1.276	–2.10	–0.253	–1.32
Sharing with others	–0.893	–1.48	–0.109	–0.57
Female* youngest child 0–5	0.358	0.57	0.063	0.35
Female* youngest child 6–12	0.164	0.17	–0.200	–0.98
Work history				
No. of previous employment spells	0.035	0.26	–0.334	–11.95
Duration of previous unemployment spells/1000	–0.320	–1.44	0.099	1.80
Duration of recent work experience/100	0.011	1.10	0.150	4.27
No. of years in paid work/10	0.120	0.48	–0.062	–0.79
No. of years looking for paid work/10	–0.693	–1.28	–0.749	–5.08
Geographical location				
Urban centre (not capital city)	–0.044	–0.17	–0.053	–0.68
Rural area	0.027	0.09	–0.064	–0.71
Victoria	–0.438	–0.88	–0.086	–0.63
Queensland and Northern Territory	–0.441	–0.87	–0.222	–1.64
South Australia	–0.634	–1.04	–0.183	–1.10
Western Australia	–0.411	–1.04	0.056	0.45
Tasmania	–0.600	–0.97	–0.133	–0.80
Australian Capital Territory	–1.153	–1.92	0.068	0.38
Ratio of job vacancies & unemployment	–7.961	–1.21	–3.396	–2.14
Income variables				
Log (own income of business/property)/10	–0.090	–0.63	0.105	2.06
Benefit receipt	–1.329	–2.47	0.868	2.54
Unemployment benefit receipt	0.449	0.66	–0.658	–1.88
Spouse characteristics				
Log (income of spouse)/10	–0.447	–1.75	–0.147	–1.91
Spouse out of labour force	0.351	0.68	0.046	0.35
Spouse unemployed	–1.513	–2.12	–0.078	–0.50
Spouse working part-time	0.611	1.35	0.724	4.78
Type of current job				
self employed	0.655	1.46	0.486	3.81
part-time employed	0.020	0.09	–0.413	–5.97

For footnotes see end of table. ...continued

6.1 HAZARD RATE ANALYSIS OF EMPLOYMENT SPELLS AFTER UNEMPLOYMENT—*continued*

	Population reference group		*Jobseekers*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
After 1 July 1995	0.447	1.69	1.666	19.20
Interaction variables				
Unemployment benefit* after 1 July 1995	0.552	1.08	0.082	0.21
Benefit receipt* after 1 July 1995	. .	. .	–0.823	–2.17
Females in special group* after 1 July 1995	—	—	0.411	0.42
Duration dependence(a)	0.774	0.057	1.007	0.04
Heterogeneity parameter	. .	. .	1.247	9.40
No. of observations	345		3744	
Log-likelihood function	–1 519.3		–17 125.3	

(a) For the duration dependence, the question is whether the coefficient differs significantly from 1 (not from 0), therefore the standard deviation is given instead of the t-statistic.

Work history

Increased duration of recent work experience (during the survey period) increases the expected employment duration. The longer a Jobseeker has been looking for work since finishing full-time education or the greater the number of previous unemployment spells the shorter the expected duration of an employment spell. The latter is consistent with the effect in the unemployment spells.

Job vacancy-unemployment ratio

Surprisingly, the higher the ratio of job vacancies to unemployment, the shorter the duration of the employment spell. This seems counterintuitive. A possible explanation could be that the vacancies are mostly for short-term jobs, which are relatively easy to obtain.

Income

Jobseekers with income from business or property have longer employment spells. The fact that they have other income probably indicates that they are better off (in connections and/or skills) than other Jobseekers and can afford to be more discriminating about job offers they receive. Those receiving benefits during employment are also more likely to have longer employment spells, the exception being those receiving unemployment benefits. For them the increase in duration is still positive, but smaller (although the coefficient is only significant at the 10% level). As with unemployment duration, the type of benefit seems to be relevant for the employment duration as well. Possibly this is because recipients of other benefits do not have to look for work. Therefore those who do look for work are likely to be more motivated or have better skills than most unemployment benefit recipients, who have to look for work to remain eligible for benefits.

Income continued

The income of the spouse is also significant at the 10% level and seems to indicate that a respondent with a spouse, who earns a higher income, had a shorter employment spell. If the respondent has a spouse who works part-time, then they had a longer employment spell. The same effect was also found for unemployment spells.

Type of employment

The type of employment also seems to affect the duration of employment spells. Self-employed Jobseekers have longer spells of employment and those in part-time work had shorter spells. The latter result might indicate that part-time work is more often short-term and provides less secure employment than full-time work. A similar result for self-employment is also found by Bryson and White (1996) in the United Kingdom.

July 1995 changes

Employment spells that are current after 1 July 1995 seem longer than those before 1 July 1995. This is probably a result of the recruitment procedure of the Jobseeker sample in May 1995, i.e. those who were unemployed or about to become unemployed were selected into the sample. In isolating the effect of the policy changes, from effects caused by a general improvement in the economic situation post-July 1995 compared to pre-July 1995, some interaction terms are included. The only one of these that is significant is constructed with the time dummy and the benefit receipt dummy. It indicates that after 1 July 1995 respondents who receive benefits have had a smaller increase in the duration of employment spells than other Jobseekers (130% increase as compared to a 430% increase in duration). Either they have benefited to a lesser extent from the improvement in the economic situation or the policy changes may have had an adverse effect on the employment spells of benefit recipients. The Earnings Credit introduced in July 1995, which improved the financial returns to short-term work for benefit recipients, resulted in an increased uptake of casual work (see Warburton et al 1999). This may explain the relatively shorter duration of employment for this group after July 1995.

Duration dependence

The estimated parameter for duration dependence is not significantly different from one, which means the probability of exit from employment does not change the longer that one is unemployed.

RESULTS FOR THE POPULATION REFERENCE GROUP

Age and age squared are both significant and their combined effect indicates that employment duration increased with age up to around 31.5 years, after which spells decreased in length. Respondents who have a disability that impedes employment, single people and those with an unemployed spouse are expected to have a shorter employment spell.

In contrast to Jobseekers, benefit receipt while working appeared to shorten the employment duration. This may be because short-term jobs are more likely to keep people eligible for benefits or because working while receiving a benefit is not that worthwhile. To gain more insight in this, future research could look at the reason for termination of employment and use this variable in a competitive risk hazard rate model, where the exit out of employment is divided into two subcategories, i.e. a category for when the employer has taken the initiative to terminate employment and a category for when it is the employee who has quit employment.

July 1995 changes

The effects of these changes were similar to the Jobseeker group, i.e. employment spells that are current after 1 July 1995 seem longer than earlier spells (although only at the 10% significance level). However, note that in the Population Reference Group there is not the 'recruitment selection' problem that is present in the Jobseeker group.

None of the interaction terms with benefit receipt are significant for the Population Reference Group, this is probably due to the group's small sample size.

Duration dependence

There is evidence of significant negative duration dependence, which means that the longer people have been in employment the less likely they are to exit from it. In an alternative specification, a parameter for unobserved heterogeneity was included. However, this parameter was highly insignificant and had little effect on the other parameters. For these reasons, the present specification without unobserved heterogeneity is preferred.

A COMPARISON OF EMPLOYMENT AND UNEMPLOYMENT DURATIONS

In general, one would expect characteristics, which have a positive effect on the duration of an unemployment spell, to have a negative effect on the duration of an employment spell and vice versa. In this section characteristics that shorten both unemployment and employment durations and, therefore, contribute to a 'churning effect' in the labour market, are examined.

A COMPARISON OF EMPLOYMENT AND UNEMPLOYMENT DURATIONS *continued*

Comparing tables 5.1 and 6.1, there were no characteristics that shortened both employment and unemployment durations for the Population Reference Group. For Jobseekers the following characteristics had the effect of reducing employment and unemployment duration.

Number of previous spells

A higher number of previous unemployment spells shortens the duration of employment and unemployment alike, this effect is difficult to interpret since spells are observed in a limited period of two years. It seems to indicate that a sequence of short employment and unemployment spells in the past are likely to be continued.

Benefit receipt

The negative effect of the interaction term 'Benefit receipt after 1 July 1995' indicates that employment and unemployment spells become shorter for benefit recipients after July 1995 compared to what they were before July 1995 and compared to other people. Thus it may be that unemployment spells are reduced for benefit recipients after July 1995 but only through access to insecure employment.

Job vacancy—unemployment ratio

The ratio of job vacancies to unemployment and unemployment benefit receipt both have the effect of shortening both types of spells. The effect of this variable on employment duration is puzzling. Why would a higher vacancy to unemployment ratio imply a shorter duration of employment spells, unless the higher number of vacancies represents a larger proportion of short-term work?

Unemployment benefits

At the 10% significance level, Jobseekers receiving unemployment benefits had shorter employment and unemployment spells than Jobseekers receiving benefits in general.[6] This may be an indication that the activity test requirement to be looking for work and willing to accept any suitable employment, including part-time and casual employment, results in these Jobseekers being more likely to take up insecure jobs than other beneficiaries.

6 The effect of receiving unemployment benefits can be found by combining the parameters on benefits and on unemployment benefits. The effect measured here is thus in comparison to people receiving benefit payments.

At a later stage, the two equations estimated in sections 5 and 6 may be estimated jointly, so the correlation between the duration of unemployment and employment spells could be taken into account.[7] Estimation of bivariate hazard rate models is discussed by Lindeboom and Van den Berg (1991).

7 The LimDep package does not allow for bivariate hazard rate models.

APPENDIX A

ATTRITION RATES

A1 RESPONDENTS LOST THROUGH ATTRITION PER LABOUR MARKET STATE IN THE PREVIOUS WAVE

	Population Reference Group				*Jobseeker*			
	Wave 2		*Wave 3*		*Wave 2*		*Wave 3*	
Labour market state in previous wave	no.	%	no.	%	no.	%	no.	%
Out of the labour force	40	10.6	20	5.8	85	14.1	64	9.1
Unemployed	22	13.5	13	9.3	359	13.7	194	13.3
Working part-time	20	6.9	13	4.9	87	12.7	64	9.3
Working full-time	77	7.7	58	6.3	108	14.1	125	11.3
Self-employed	14	5.1	16	6.4	19	10.4	16	6.6
Total through attrition	173	8.3	120	6.3	658	13.5	463	11.0
Total sample size	2093	100.0	1920	100.0	4860	100.0	4202	100.0

A2 RESPONDENTS LOST THROUGH ATTRITION PER BENEFIT RECEIPT IN THE PREVIOUS WAVE

	Population Reference Group				*Jobseeker*			
	Wave 2		*Wave 3*		*Wave 2*		*Wave 3*	
Benefit receipt in previous wave	no.	%	no.	%	no.	%	no.	%
No benefits	122	7.5	n.a.	n.a.	357	14.0	n.a.	n.a.
Unemployment	16	19.5	n.a.	n.a.	185	13.1	n.a.	n.a.
Sole parent	9	15.0	n.a.	n.a.	21	12.1	n.a.	n.a.
Partner/parenting	1	2.0	n.a.	n.a.	7	5.5	n.a.	n.a.
Disability/sickness	4	10.0	n.a.	n.a.	10	12.8	n.a.	n.a.
Other benefits	4	10.8	n.a.	n.a.	3	7.3	n.a.	n.a.
Total through attrition	156	8.2	102	5.9	583	13.3	405	10.6
Total sample size	1898	100.0	1742	100.0	4388	100.0	3805	100.0

APPENDIX B

DEFINITION OF THE VARIABLES USED IN THE ANALYSES

Personal characteristics:

Age—age at the moment of recruitment (a continuous variable)

Age at start unemployment—approximate age at the moment of becoming unemployed (a continuous variable)

Age at start employment—approximate age at the start of a new employment episode (a continuous variable)

Male—gender indicator (a dummy variable, base case is a woman)

Female in special group—indicator of women born before 1 July 1955, without dependent children and part of a couple, receiving one of the unemployment benefits, partner or parental allowances (a dummy variable, base case is all people other than the above described person)

Disabled—disability indicator (a dummy variable, base case is a non-disabled person)

Disability that impedes employment—indicator of the severity of the disability, which combined with the dummy variable above can indicate three levels of disability: none, disability that does not impede employment, disability that impedes employment (a dummy variable, base case is a person who does not have a disability that impedes employment)

'Skilled/unskilled vocational or finished secondary school' and 'degree or diploma'—together these two indicate the education level (two dummy variables, base case is a person with a lower education than the two levels described in the variable names)

received training in last year—indicator of whether any training was received in the past wave (year) of the survey (a dummy variable, base case is a person who received no training in the past year)

English proficiency less than good—indicator of the level of English proficiency (a dummy variable, base case is a person whose English proficiency is good or better than good)

writing proficiency less than good—indicator of whether the writing proficiency is qualified as less than good (a dummy variable, base case is a person whose writing proficiency is good or better than good)

reading proficiency less than good—indicator of whether the reading proficiency is qualified as less than good (a dummy variable, base case is a person whose reading proficiency is good or better than good)

Speaking proficiency less than good—indicator of whether the speaking proficiency can be qualified as less than good (a dummy variable, the benchmark is a person whose speaking proficiency is good or better than good)

Non-English background speaker—indicator of whether an immigrant comes from an non-English speaking country (a dummy variable, the benchmark is a person born in Australia or an immigrant from an English speaking country)

Immigrated after 1984—indicator of the year in which immigration took place (a dummy variable, the benchmark is a non-immigrant or a person who immigrated in 1984 or before)

Aborigine or Torres Strait Islander—indicator of whether a person is of Aboriginal or Torres Strait Islander descent (a dummy variable, the benchmark is a person from other descent)

Household characteristics

Number of children $_{-1}$—number of children in the household at the previous interview one year ago (a continuous variable)

Number of children—number of children in the household (a continuous variable)

Newborn child—indicator that a child was born in the past year (a dummy variable, the benchmark is a person without a newborn baby)

'Single' and 'sharing with others'—together these two indicate the household relation of the respondent. An unmarried person lives alone or only with children and a person who shares with others lives together with other people, but is independent of them, i.e. they are not a spouse or a dependent child (two dummy variables, the benchmark is a person who is one of a married or de facto couple)

'Age youngest child 0–5' and 'age youngest child 6–12'—together these two indicate whether there is a child below 13 years of age (two dummy variables, the benchmark is a person without children in these age groups)

Geographical location

'urban centre (not capital city)' and 'rural area'—together these two indicate the degree of urbanisation of the respondents location of residency (two dummy variables, the benchmark is a person living in a capital city)

'Victoria', 'Queensland and Northern Territory', 'South Australia', 'Western Australia', 'Tasmania' and 'Australian Capital Territory'—together these indicate in which state the respondent lives (six dummy variables, the benchmark is a person living in New South Wales)

Ratio of vacancies & unemployment—the number of job vacancies in the private and public sector per state[1] divided by the registered number of unemployed people per state[2] (a continuous variable, calculated on a quarterly basis: the quarter July, August and September is represented by the numbers from August, the quarter October, November, December is represented by the numbers from November, etc.)

Work History

No. of years in paid work—number of years a respondent has been in paid work since leaving full-time schooling (a continuous variable)

No. of years looking for work—number of years a respondent has been looking for work since leaving full-time schooling (a continuous variable)

'*Out of the labour force* $_{-1}$', '*unemployment* $_{-1}$', '*part-time work* $_{-1}$' and '*self employed* $_{-1}$'—together these indicate the labour market state of the respondent one year ago (four dummy variables, the benchmark is a person who was in full-time work one year ago)

Employed $_{-1}$—indicator of whether the respondent was working one year ago (a dummy variable, the benchmark is a person who was not working one year ago)

Number of previous unemployment spells—the number of unemployment spells, before the current episode, in the time span of the survey (a continuous variable)

Duration of previous unemployment spells—the sum of the duration of the previous unemployment spells that occurred during the survey (a continuous variable)

Duration of recent work experience—the sum of the duration of all employment episodes that occurred during the survey preceding the current episode (a continuous variable)

'Self-employed' and 'part-time work'—these two variables indicate the type of employment the respondent currently has (two dummy variables, the benchmark is a person who works full-time)

1 These numbers are found in the August issues of *Job Vacancies and Overtime, Australia* (ABS, 1995a, 1996a).

2 These numbers are found in the August issues of *Labour Force, Australia* (ABS, 1995b, 1996b).

Income variables

Log(business/property income)—logarithm of the respondent's income from his/her own business or property plus 10^{-7} (the latter is added to avoid taking the logarithm of 0 which is not defined) (a continuous variable, which is only used in the unemployment/ part-time work/ full-time work models, because it is deterministic in the models where self-employed people are still included)

Benefits $_{-1}$—indicates whether the respondent received benefit payments one year ago (a dummy variable, the benchmark a person who did not receive benefit payments)

Benefit receipt—indicates whether a person is receiving benefit payments during the current episode (a dummy variable, the benchmark is a person who is not receiving benefits)

Unemployment benefit receipt—indicates whether a person is receiving unemployment benefits during the current episode (a dummy variable, the benchmark is a person who is not receiving unemployment benefits

Spouse characteristics

Log(income of spouse)—logarithm of the amount of income of the spouse plus 10^{-7} (the latter is added to avoid taking the logarithm of 0 which is not defined) (a continuous variable)

Benefit receipt of spouse—indicator of the benefit receipt of the spouse (a dummy variable, the benchmark is a person with a spouse who did not receive benefits)

Change in income of spouse—the amount with which the income of the spouse has changed (a continuous variable)

Change in income of spouse and own business/property income—the amount with which the income of the spouse plus the respondent's own business and property income has changed (a continuous variable, used instead of the above variable in the unemployment/part-time/full-time model, because it indicates all other income; it is not used in the other transition models, because self-employed people by definition always have business and property income)

Change in benefit receipt of spouse—indicator that the spouse starts or stops receiving benefits (a variable with: value –1 to indicate that previous year the spouse received benefits and currently does not any more, and value 1 to indicate that previous year the spouse did not receive benefits and currently does, the benchmark is a person where the benefit receipt of the spouse has not changed over the year)

'Spouse is out of labour force', 'spouse is unemployed' and 'spouse is in part-time work'—these indicate the labour market state of the spouse (three dummy variables, the benchmark is a person with a full-time employed spouse)

'Increase labour supply spouse' and *'decrease labour supply spouse'*—these two variables indicate whether the spouse changed their labour supply enough to move between not working, part-time work and full-time work (two dummy variables, the benchmark is a person whose spouse did not change labour supply to a sufficient degree to be measured)

After 1 July 1995—indicates which episode or part of an episode occurred after 1 July 1995 (a dummy variable, the benchmark is a person with an episode before July 1995)

Interaction variables—a variable constructed by multiplying the values of two variables; this allows for a joint effect of two variables that is not simply the sum of the two separate effects, this can be interpreted as a variable having different effects for different groups. For example, the interaction of gender and education indicates that males and females would be differently affected by a change in education level.

The variable name consists of the two variables from which it is constructed separated by an asterisk.

Benchmark—a person with all the dummy variables set to zero and with the following values for the continuous variables:

- age is 35 years old (for all the different age variables)
- the number of children in the current and the previous period is zero
- the ratio of vacancies and unemployment is 0.06 (the median value in the unemployment spell data set), the number of years in paid work is set to 10
- the number of years looking for work is set to zero
- the number of previous unemployment spells is set to zero
- the duration of previous unemployment spells is set to zero
- the duration of recent work experience is set to zero
- business/property income is set to zero
- income of spouse is set to zero
- change in income of spouse is set to zero
- change in income of spouse and own business/property income is set to zero

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TABLES OF THE ESTIMATED TRANSITION MODELS

BIVARIATE PROBIT MODEL OF FEMALE LABOUR FORCE PARTICIPATION AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(labour force absence)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–1.377	–3.47	–2.206	–2.76
Personal characteristics				
Disabled	—	—	–0.360	–0.94
Disability which impedes employment	0.442	2.08	—	—
Skilled/unskilled vocational or finished secondary school	–0.396	–2.19	–0.309	–0.95
Degree or diploma	–0.711	–2.35	–0.708	–1.60
Received training in last year	–0.618	–2.60	–0.657	–1.65
Immigrated after 1984	—	—	1.083	1.37
Household characteristics				
Number of children$_{-1}$	–0.404	–1.54	—	—
Number of children	0.367	1.38	–0.065	–0.32
Employed$_{-1}$ *no. children$_{-1}$	0.324	1.87	—	—
Newborn child	1.062	2.60	—	—
Single	–0.517	–2.20	0.522	0.88
Sharing with others	–0.082	–0.16	0.671	0.98
Geographical location				
Urban centre (not capital city)	0.100	0.44	—	—
Rural area	–0.574	–2.22	—	—
Work history				
No. of years in paid work/10	–0.066	–0.58	–0.298	–1.36
Unemployment$_{-1}$	1.606	3.64	0.700	0.89
Part-time work$_{-1}$	0.000	0.00	0.591	0.90
Out of the labour force$_{-1}$	2.473	7.40	0.461	0.58
Self employed$_{-1}$	0.520	0.98	0.967	1.16
(De facto) spouse				
Change in income of spouse/1000 (=chinc)	0.175	0.55	1.933	1.02
Change in benefit receipt of spouse (=chbre)	–1.249	–0.96	0.164	0.10
Spouse is absent in labour force	0.276	0.68	0.415	0.48
Spouse is unemployed	0.021	0.05	0.070	0.05
Spouse is in part-time work	–0.536	–0.68	–0.768	–0.76
Increase labour supply spouse	–0.491	–1.19	1.038	1.39
Decrease labour supply spouse	0.423	0.72	1.058	0.95
Benefits$_{-1}$	0.938	1.30	4.463	3.81
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	–2.493	–2.05	–1.843	–1.45
benefits$_{-1}$ * part-time work$_{-1}$	–0.063	–0.07	–1.613	–1.38
benefits$_{-1}$ * out of the labour force$_{-1}$	–0.804	–1.06	–0.520	–0.40
chinc *employed$_{-1}$	–0.361	–0.72	–1.667	–0.87
chinc *(absent from labour force)$_{-1}$	–0.717	–1.51	–1.944	–0.98
chbre * employed$_{-1}$	0.335	0.22	1.030	0.56
chbre * (absent from labour force)$_{-1}$	1.157	0.83	0.506	0.26
correlation coefficient	0.169	0.51	. .	. .
number of observations	740	. .	. .	. .
log likelihood	–280.43	. .	. .	. .
restricted log likelihood	–785.75	. .	. .	. .

BIVARIATE PROBIT MODEL OF FEMALE SELF EMPLOYMENT AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(self employed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–14.213	–0.94	–2.036	–4.05
Personal characteristics				
Age/10	4.637	0.64	—	—
Age squared/100	–0.488	–0.57	—	—
Disabled	—	—	–0.826	–0.87
Disability which impedes employment	–1.382	–0.75	0.454	0.45
Skilled/unskilled vocational or finished secondary school	–0.642	–0.58	0.026	0.07
Degree or diploma	0.285	0.29	–0.819	–1.37
Received training in last year	—	—	–0.614	–1.49
English proficiency less than good	0.929	0.45	–0.434	–0.58
Household characteristics				
Number of children	–0.531	–0.48	–0.144	–0.31
Age youngest child 0–5	1.912	0.69	0.294	0.32
Age youngest child 6–12	2.130	0.77	0.483	0.51
Single	–0.842	–0.37	0.193	0.37
Sharing with others	0.022	0.01	0.658	1.21
Geographical location				
Urban centre (not capital city)	0.508	0.36	—	—
Rural area	0.979	0.78	—	—
Victoria	0.762	0.42	—	—
Queensland	0.134	0.09	—	—
South Australia	0.462	0.28	—	—
Western Australia	0.432	0.24	—	—
Tasmania	–0.321	–0.12	—	—
Australian Capital Territory	–0.153	–0.04	—	—
Work history				
No. of years in paid work/10	0.272	0.47	–0.081	–0.40
Unemployment–1	0.680	0.48	0.099	0.17
Part-time work–1	–0.268	–0.17	0.181	0.37
Out of the labour force–1	–0.332	–0.15	0.070	0.11
Self employed–1	4.358	1.94	0.596	0.61
Benefits–1	—	—	3.115	5.04
(De facto) spouse				
Log (income of spouse)/10	–0.285	–0.41	—	—
Benefit receipt of spouse	—	—	0.659	0.90
Spouse absent from labour force	–0.766	–0.32	—	—
Spouse in part-time work	–1.196	–0.43	—	—
Increase labour supply spouse	1.713	0.91	—	—
decrease labour supply spouse	–0.962	–0.35	—	—
correlation coefficient	0.997	0.71	. .	. .
number of observations	536	. .	. .	. .
log likelihood	–101.29	. .	. .	. .
restricted log likelihood	–358.68	. .	. .	. .

MULTINOMIAL LOGIT MODEL OF FEMALE UNEMPLOYMENT, PART-TIME AND FULL-TIME WORK FOR THE GENERAL POPULATION

	P(part-time)		*P(full-time)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–3.317	–1.02	3.915	1.16
Personal characteristics				
Age/10	3.478	2.02	1.645	0.91
Age squared/100	–0.501	–2.14	–0.268	–1.10
Disabled	–0.483	–0.84	–1.180	–1.84
Skilled/unskilled vocational or finished secondary school	–0.150	–0.27	0.978	1.64
Degree or diploma	–0.277	–0.36	0.734	0.91
Received training in last year	1.613	2.62	1.950	3.06
Non-English background speaker	–0.667	–1.01	–0.775	–1.01
Immigrated after 1984	–2.071	–1.99	–3.498	–3.10
Household characteristics				
Number of children	–0.145	–0.47	–0.636	–1.83
Age youngest child 0–5	–0.949	–1.48	–0.471	–0.61
Single	–2.391	–1.54	–3.569	–2.20
Sharing with others	–4.518	–2.64	–5.098	–2.95
Geographical location				
Urban centre (not capital city)	1.017	1.51	0.935	1.26
Rural area	1.030	1.35	0.104	0.12
Victoria	0.272	0.34	–0.367	–0.42
Queensland	–0.812	–0.98	–1.330	–1.52
South Australia	0.695	0.86	–1.109	–1.18
Western Australia	–1.334	–1.69	–1.831	–2.12
Tasmania	–1.087	–1.12	–2.128	–1.91
Australian Capital Territory	0.584	0.51	–0.079	–0.07
Work history				
No. of years in paid work/10	1.059	2.35	0.739	1.48
Unemployment$_{-1}$	–1.991	–1.97	–4.380	–4.22
Part-time work$_{-1}$	2.135	2.44	–2.378	–2.85
Out of the labour force$_{-1}$	–1.078	–1.05	–4.790	–4.29
Self employed$_{-1}$	–0.595	–0.40	–5.301	–3.34
Log (businsess/property income)/10	0.943	1.77	0.709	1.29
Benefits$_{-1}$	–0.107	–0.18	–2.373	–3.09
(De facto) spouse				
Log (income of spouse)/10	–1.029	–1.31	–1.902	–2.36
Change in benefit receipt of spouse (=chbre)	2.673	1.62	2.532	1.42
Change in income of spouse + own business/property income/1000 (=chinc)	–0.119	–0.74	0.012	0.04
Spouse absent from labour force	–0.295	–0.24	–0.143	–0.10
Spouse unemployed	1.128	0.80	–1.054	–0.46
Spouse part-time	–0.602	–0.40	–0.409	–0.24
Increase labour supply spouse	1.921	1.20	3.016	1.77
decrease labour supply spouse	–2.691	–1.71	–1.682	–0.90
Interaction variables				
chinc* (absent from labour force)$_{-1}$	–3.466	–1.22	5.095	1.09
chbre* (absent from labour force)$_{-1}$	–4.622	–1.89	3.107	0.64
number of observations	494	. .	. .	. .
log likelihood	–188.62	. .	. .	. .
restricted log likelihood	–473.89	. .	. .	. .

BIVARIATE PROBIT MODEL OF FEMALE UNEMPLOYMENT AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(unemployed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	0.273	0.11	–3.505	–3.39
Personal characteristics				
Age/10	–1.976	–1.57	—	—
Age squared/100	0.274	1.65	—	—
Disabled	0.190	0.47	–0.494	–0.98
Skilled/unskilled vocational or finished secondary school	–0.172	–0.43	–0.041	–0.09
Degree or diploma	–0.117	–0.18	–1.053	–1.61
Received training in last year	–0.495	–1.08	—	—
English proficiency less than good	—	—	–0.810	–0.59
Non-English speaking background	0.196	0.34	—	—
Immigrated after 1984	1.263	1.34	1.474	0.82
Household characteristics				
Number of children	0.127	0.58	—	—
Age youngest child 0–5	0.443	1.02	—	—
Single	0.760	0.38	0.745	0.68
Sharing with others	1.314	0.66	1.270	0.88
Geographical location				
Urban centre (not capital city)	–0.507	–1.22	—	—
Rural area	–0.684	–1.18	—	—
Victoria	–0.082	–0.14	—	—
Queensland	0.443	0.81	—	—
South Australia	–0.048	–0.08	—	—
Western Australia	0.603	1.26	—	—
Tasmania	0.856	1.43	—	—
Australian Capital Territory	–0.381	–0.58	—	—
Work history				
No. of years in paid work/10	–0.183	–0.54	—	—
Unemployment$_{-1}$	2.343	4.03	–0.272	–0.35
Part-time work$_{-1}$	0.592	1.01	0.414	0.46
Out of the labour force$_{-1}$	1.967	2.95	0.437	0.24
Self employed$_{-1}$	1.612	2.01	1.128	1.08
Log (businsess/property income)/10	–0.330	–0.71	–0.540	–1.24
Benefits$_{-1}$	0.193	0.54	3.724	3.51
Log (income of spouse)/10	0.248	0.24	0.128	0.21
Change in benefit receipt of spouse (=chbre)	–0.227	–0.23	—	—
Change in income of spouse + own business/property income/1000 (=chinc)	–0.011	–0.09	—	—
Spouse absent from labour force	0.336	0.38	0.746	0.34
Spouse unemployed	0.062	0.06	1.637	1.39
Spouse part-time	–0.261	–0.24	0.819	0.35
Interaction variables				
Benefits$_{-1}$ *part-time work$_{-1}$	—	—	–0.497	–0.38
Benefits$_{-1}$ *absent from labour force$_{-1}$	—	—	–0.638	–0.33
chinc* (absent from labour force)$_{-1}$	0.331	0.25	—	—
chbre* (absent from labour force)$_{-1}$	1.168	0.80	—	—
Correlation coefficient	0.805	2.81	. .	. .
number of observations	494	. .	. .	. .
log likelihood	–138.74	. .	. .	. .
restricted log likelihood	–345.87	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE LABOUR FORCE PARTICIPATION AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(labour force absence)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–0.871	–0.34	–3.813	–1.48
Personal characteristics				
Age/10	–1.445	–1.03	0.681	0.51
Age squared/100	0.315	1.51	0.047	0.25
Disabled	—	—	0.442	0.67
Disability which impedes employment	0.473	0.68	0.331	0.41
Skilled/unskilled vocational or finished secondary school	–0.270	–0.42	–0.642	–1.16
Degree or diploma	–0.385	–0.44	–1.037	–0.92
Received training in last year	–0.313	–0.34	–0.308	–0.64
Non-English speaking background	0.486	0.73	0.550	0.87
Immigrated after 1984	—	—	–0.337	–0.23
English proficiency less than good	—	—	0.164	0.15
Household characteristics				
Number of children	0.012	0.02	—	—
Number of children$_{-1}$	–0.979	–1.17	—	—
Age youngest child 0–5	0.878	0.74	–0.906	–0.94
Age youngest child 6–12	—	—	–0.860	–0.76
Single	1.215	0.39	—	—
Sharing with others	1.836	0.55	—	—
Geographical location				
Urban centre (not capital city)	–0.363	–0.42	0.984	1.38
Rural area	–0.980	–1.08	0.907	1.43
Victoria	—	—	0.411	0.52
Queensland	—	—	–0.042	–0.04
South Australia	—	—	0.189	0.21
Western Australia	—	—	–0.777	–0.97
Tasmania	—	—	–0.813	–0.85
Australian Capital Territory	—	—	1.359	1.09
Work history				
No. of years in paid work/10	–0.620	–0.85	–0.942	–1.28
Unemployment$_{-1}$	–1.108	–0.89	–0.194	–0.26
Part-time work$_{-1}$	–0.535	–0.50	0.328	0.36
Out of the labour force$_{-1}$	1.880	2.43	—	—
Benefits$_{-1}$	0.590	0.76	2.890	3.23
(De facto) spouse				
Log (income of spouse)/10	0.612	0.37	–0.207	–0.61
Benefit receipt of spouse	0.611	0.57	—	—
Change in income of spouse/1000	0.030	0.23	–0.151	–0.17
Change in benefit receipt of spouse (=chbre)	1.044	0.27	1.256	1.32
Increase labour supply spouse	0.641	0.53	–1.323	–0.91
Decrease labour supply spouse	0.567	0.57	—	—
Interaction variables				
Employed$_{-1}$ *no. of children$_{-1}$	0.720	0.81	—	—
Benefits$_{-1}$ *part-time work$_{-1}$	—	—	–0.616	–0.38
Benefits$_{-1}$ *out of the labour force$_{-1}$	—	—	0.592	0.40
chbre* (absent from labour force)$_{-1}$	–2.992	–0.70	–1.655	–0.15
chbre* employed$_{-1}$	–0.976	–0.25	–0.367	–0.20
Correlation coefficient	0.488	0.71	. .	. .
number of observations	732	. .	. .	. .
log likelihood	–140.61	. .	. .	. .
restricted log likelihood	–324.31	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE SELF EMPLOYMENT AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(self employed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–2.088	–1.13	–5.112	–1.56
Personal characteristics				
Age/10	–0.151	–0.15	0.970	0.58
Age squared/100	0.037	0.28	0.080	0.34
Disabled	—	—	0.903	1.34
Disability which impedes employment	–0.201	–0.42	—	—
Skilled/unskilled vocational or finished secondary school	–0.083	–0.22	–0.624	–1.03
Degree or diploma	–0.132	–0.22	–1.487	–1.04
Received training in last year	0.165	0.38	–0.622	–1.32
Non-English speaking background	—	—	0.297	0.37
Immigrated after 1984	—	—	0.357	0.21
English proficiency less than good	—	—	0.566	0.47
Household characteristics				
Number of children	0.253	1.14	0.455	0.89
Age youngest child 0–5	–1.177	–1.80	–2.623	–1.53
Age youngest child 6–12	–0.425	–0.69	–1.706	–0.90
Single	–0.402	–0.38	—	—
Sharing with others	0.285	0.28	—	—
Geographical location				
Urban centre (not capital city)	0.350	0.86	1.297	1.59
Rural area	0.184	0.45	1.145	1.29
Victoria	–0.580	–1.16	1.179	1.05
Queensland	0.145	0.34	0.340	0.27
South Australia	0.121	0.20	1.137	0.92
Western Australia	0.156	0.34	–0.325	–0.31
Tasmania	–0.813	–0.98	–0.886	–0.81
Australian Capital Territory	–1.738	–2.07	1.030	0.32
Work history				
No. of years in paid work/10	—	—	–1.521	–1.83
Part-time work$_{-1}$	—	—	0.239	0.25
Out of the labour force$_{-1}$	1.770	3.04	1.310	0.77
Self employed$_{-1}$	3.428	9.57	–0.408	–0.29
Benefits$_{-1}$	—	—	3.731	3.81
(De facto) spouse				
Log (income of spouse)/10	0.129	0.26	–0.185	–0.42
Benefit receipt of spouse	0.473	0.94	—	—
Change in income of spouse/1000	—	—	–0.446	–0.63
Change in benefit receipt of spouse (=chbre)	—	—	0.020	0.02
Spouse absent from labour force	–0.545	–0.70	—	—
Spouse unemployed	–0.416	–0.28	—	—
Spouse in part-time work	0.321	0.81	—	—
Increase labour supply spouse	0.340	0.59	–2.251	–1.09
Decrease labour supply spouse	0.333	0.48	—	—
Interaction variables				
Benefits$_{-1}$ *unemployment$_{-1}$	—	—	–0.525	–0.56
Benefits$_{-1}$ *part-time work$_{-1}$	—	—	–1.043	–0.73
Benefits$_{-1}$ *out of the labour force$_{-1}$	—	—	–1.397	–0.36
chinc* out of the labour force$_{-1}$	1.975	0.64	5.402	0.40
chbre* out of the labour force$_{-1}$	—	—	–1.282	–0.14
chbre* employed$_{-1}$	—	—	1.051	0.59
Correlation coefficient	0.379	0.27	. .	. .
number of observations	696	. .	. .	. .
log likelihood	–156.84	. .	. .	. .
restricted log likelihood	–480.33	. .	. .	. .

MULTINOMIAL LOGIT MODEL OF MALE UNEMPLOYMENT, PART-TIME AND FULL-TIME WORK FOR THE GENERAL POPULATION

	P(part time)		*P(full time)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	7.843	2.15	4.604	1.84
Personal characteristics				
Age/10	–3.710	–1.86	–0.445	–0.34
Age squared/100	0.247	0.94	–0.112	–0.61
Disabled	–1.728	–1.49	–0.752	–1.06
Disability which impedes employment	0.496	0.39	–0.548	–0.68
Skilled/unskilled vocational or finished secondary school	–0.052	–0.07	0.458	0.93
Degree or diploma	0.553	0.52	0.970	1.35
Received training in last year	0.046	0.07	0.625	1.34
Household characteristics				
Number of children	0.069	0.12	–0.219	–0.61
Age youngest child 0–5	–0.028	–0.02	1.635	1.45
Age youngest child 6–12	–1.782	–0.95	1.729	1.45
Single	1.139	0.52	0.743	0.59
Sharing with others	0.700	0.32	0.767	0.58
Geographical location				
Urban centre (not capital city)	–1.369	–1.37	–0.137	–0.24
Rural area	0.413	0.45	0.245	0.36
Victoria	–0.246	–0.27	0.283	0.42
Queensland	–0.811	–0.74	–0.023	–0.03
South Australia	–1.464	–1.40	–1.625	–2.27
Western Australia	–0.986	–0.90	0.185	0.24
Tasmania	–0.664	–0.58	–0.195	–0.22
Australian Capital Territory	–0.292	–0.18	0.004	0.00
Work history				
No. of years in paid work/10	1.408	1.19	0.986	1.56
Unemployment_{-1}	–2.046	–1.49	–3.194	–4.27
$\text{Part-time work}_{-1}$	3.561	3.21	–0.529	–0.59
$\text{Out of the labour force}_{-1}$	–5.376	–0.81	–2.268	–1.93
Benefits_{-1}	–1.856	–1.33	–2.346	–2.19
(De facto) spouse				
Log (income of spouse)/10	0.835	0.80	0.700	1.15
Benefit receipt of spouse	–1.510	–0.96	–3.043	–2.90
Change in benefit receipt of spouse (=chbre)	–0.379	–0.21	1.046	0.73
Change in income of spouse + own business/property income/1000 (=chinc)	–3.154	–0.74	–0.385	–0.12
Spouse absent from labour force	0.535	0.31	3.090	2.90
Spouse unemployed	–0.431	–0.23	–0.270	–0.25
Spouse part time	0.059	0.05	1.659	0.59
Increase labour supply spouse	–0.078	–0.06	–0.891	–1.14
Decrease labour supply spouse	2.215	1.51	–0.371	–0.34
Interaction variables				
Benefits_{-1} *unemployment_{-1}	3.275	1.70	1.541	1.15
chinc* $(\text{absent from labour force})_{-1}$	–17.589	–1.10	–5.603	–0.64
chinc* $(\text{employed})_{-1}$	4.420	1.05	0.842	0.27
chbre* $(\text{absent from labour force})_{-1}$	11.286	1.32	0.210	0.07
chbre* $(\text{employed}_{-1}$	–1.981	–0.90	–1.540	–0.92
number of observations	573	. .	. .	. .
log likelihood	–159.72	. .	. .	. .
restricted log likelihood	–302.84	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE UNEMPLOYMENT AND BENEFIT RECEIPT FOR THE GENERAL POPULATION

	P(unemployed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–1.886	–2.70	–2.327	–2.40
Personal characteristics				
Disability which impedes employment	0.540	1.25	1.023	1.62
Skilled/unskilled vocational or finished secondary school	–0.197	–0.56	–0.240	–0.39
Degree or diploma	–0.197	–0.31	–0.064	–0.08
Received training in last year	–0.226	–0.58	–0.531	–1.03
Household characteristics				
Age youngest child 0–5	–0.912	–1.22	–2.241	–1.64
Age youngest child 6–12	–0.652	–0.74	–1.344	–0.89
Single	–0.748	–0.78	—	—
Sharing with others	–0.619	–0.59	—	—
Geographical location				
Urban centre (not capital city)	0.188	0.44	0.802	1.14
Rural area	–0.322	–0.48	0.687	1.03
Victoria	–0.109	–0.20	0.476	0.58
Queensland	0.160	0.29	–0.248	–0.23
South Australia	0.835	1.38	0.957	0.91
Western Australia	0.024	0.04	–0.216	–0.28
Tasmania	0.144	0.19	–0.302	–0.27
Australian Capital Territory	–0.024	–0.01	–0.006	0.00
Work history				
No. of years in paid work/10	0.138	0.71	—	—
Unemployment$_{-1}$	1.827	3.26	—	—
Part-time work$_{-1}$	0.059	0.07	—	—
Out of the labour force$_{-1}$	1.221	1.38	—	—
Benefits$_{-1}$	1.130	1.37	2.591	4.03
(De facto) spouse				
Log (income of spouse)/10	–0.344	–0.58	—	—
Benefit receipt of spouse	1.507	1.63	1.527	0.82
Change in benefit receipt of spouse (=chbre)	–0.353	–0.40	–0.394	–0.28
Change in income of spouse + own business/property income/1000 (=chinc)	1.561	0.51	—	—
Spouse absent from labour force	–1.545	–1.72	–1.403	–0.76
Spouse unemployed	0.209	0.25	–1.797	–0.99
Spouse part time	–1.004	–1.41	–1.092	–0.74
Increase labour supply spouse	0.531	0.75	—	—
Interaction variables				
Benefits$_{-1}$ *unemployment$_{-1}$	–0.739	–0.71	—	—
chinc* (absent from labour force)$_{-1}$	–0.721	–0.17	—	—
chinc* (employed)$_{-1}$	–1.745	–0.57	—	—
chbre* (employed)$_{-1}$	0.259	0.19	—	—
Correlation coefficient	0.952	9.05	. .	. .
number of observations	573	. .	. .	. .
log likelihood	–140.06	. .	. .	. .
restricted log likelihood	–270.26	. .	. .	. .

BIVARIATE PROBIT MODEL OF FEMALE LABOUR FORCE PARTICIPATION AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(labour force absence)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–0.661	–1.06	–1.153	–2.23
Personal characteristics				
Age/10	–0.528	–1.73	–0.313	–1.08
Age squared/100	0.082	2.02	0.038	0.92
Disability which impedes employment	0.499	4.72	0.331	2.71
Skilled/unskilled vocational or finished secondary school	–0.135	–1.38	0.003	0.04
Degree or diploma	–0.404	–2.27	–0.359	–2.25
Non-English speaking background	–0.077	–0.57	0.347	1.90
English proficiency not good	—	—	–0.240	–1.09
Received training in last year	–0.409	–3.44	–0.355	–3.56
Household characteristics				
Number of children	0.176	1.66	—	—
Number of children$_{-1}$	–0.310	–3.01	—	—
Employed$_{-1}$ *no. of children$_{-1}$	0.093	0.82	—	—
Age youngest child 0–5	0.536	2.94	0.619	3.87
Age youngest child 6–12	0.506	2.73	0.583	4.18
Newborn child	1.079	3.67	0.513	2.08
Single	–0.183	–0.67	0.843	5.27
Sharing with others	–0.535	–1.72	0.685	3.85
Geographical location				
Urban centre (not capital city)	–0.035	–0.31	0.129	1.19
Rural area	–0.099	–0.72	–0.139	–0.99
Work history				
No. of years in paid work/10	–0.080	–1.03	—	—
Unemployment$_{-1}$	0.786	2.84	–0.262	–1.64
Part-time work$_{-1}$	0.178	0.60	–0.456	–2.35
Out of the labour force$_{-1}$	1.817	6.29	–0.199	–0.99
Self employed$_{-1}$	–0.373	–0.72	–0.088	–0.24
Benefits$_{-1}$	0.246	0.53	1.646	5.66
(De facto) spouse				
Log (income of spouse)/10	0.082	0.62	—	—
Benefit receipt of spouse	–0.201	–0.72	0.381	0.98
Change in income of spouse/1000 (=chinc)	0.191	0.61	0.408	0.98
Change in benefit receipt of spouse (=chbre)	0.125	0.47	0.119	0.45
Spouse is absent from labour force	0.307	1.04	–0.054	–0.12
Spouse is unemployed	–0.284	–0.83	0.138	0.35
Spouse is in part-time work	–0.201	–0.67	0.236	0.67
Increase labour supply spouse	0.148	0.68	0.136	0.54
Decrease labour supply spouse	0.018	0.07	–0.248	–0.95
Interaction variables				
Benefits$_{-1}$ *unemployment$_{-1}$	–0.513	–1.06	0.369	1.16
Benefits$_{-1}$ *part-time work$_{-1}$	–0.242	–0.42	0.337	0.93
Benefits$_{-1}$ *out of the labour force$_{-1}$	–0.097	–0.19	0.775	1.92
chinc* (absent from labour force)$_{-1}$	0.712	1.56	–0.243	–0.48
chinc* employed$_{-1}$	–0.314	–0.93	–0.191	–0.33
chbre* (absent from labour force$_{-1}$	0.478	1.39	0.246	0.46
chbre* employed$_{-1}$	0.630	1.09	–0.095	–0.24
newborn* (absent from labour force)$_{-1}$	–1.381	–3.47	—	—
newborn* (employed)$_{-1}$	0.368	0.77	0.603	1.51
Correlation coefficient	0.21	2.94	. .	. .
number of observations	1 564	. .	. .	. .
log likelihood	–1106.28	. .	. .	. .
restricted log likelihood	–1843.49	. .	. .	. .

BIVARIATE PROBIT MODEL OF FEMALE SELF EMPLOYMENT AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(self employed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–4.033	–2.21	–1.585	–5.83
Personal characteristics				
Age/10	0.720	0.67	—	—
Age squared/100	–0.080	–0.59	—	—
Disabled	0.261	0.71	—	—
Disability which impedes employment	–0.470	–1.13	0.177	1.21
Skilled/unskilled vocational or finished secondary school	0.130	0.52	0.061	0.54
Degree or diploma	0.191	0.52	–0.309	–1.93
Received training in last year	—	—	–0.351	–3.22
Immigrated after 1984	–0.556	–1.30	—	—
English proficiency less than good	0.555	1.19	—	—
Household characteristics				
Number of children	0.096	0.69	0.171	2.96
Single	–1.050	–2.12	1.251	2.68
Sharing with others	–0.777	–1.47	0.929	2.01
Geographical location				
Urban centre (not capital city)	0.001	0.00	—	—
Rural area	0.238	0.72	—	—
Victoria	0.101	0.27	0.134	0.92
Queensland	0.480	1.35	–0.053	–0.31
South Australia	0.311	0.65	–0.152	–0.91
Western Australia	0.549	1.43	–0.138	–0.66
Tasmania	0.112	0.18	–0.273	–1.21
Australian Capital Territory	0.379	0.48	–0.178	–0.47
Work history				
No. of years in paid work/10	0.091	0.48	–0.100	–1.48
Unemployment$_{-1}$	0.508	1.07	–0.344	–1.97
Part-time work$_{-1}$	—	—	–0.411	–2.00
Absent from labour force$_{-1}$	0.693	1.35	–0.249	–0.88
Self employed$_{-1}$	2.571	6.23	0.086	0.20
Benefits$_{-1}$	0.341	0.75	1.653	5.62
(de facto) spouse				
Log (income of spouse)/10	–0.416	–2.00	0.187	0.81
Benefit receipt of spouse	0.178	0.14	0.603	1.36
Change in income of spouse/1000 (=chinc)	–0.009	–0.02	0.273	0.69
Change in benefit receipt of spouse (=chbre)	0.553	0.77	–0.103	–0.37
Spouse absent from labour force	–0.649	–0.46	0.083	0.17
Spouse unemployed	–1.120	–0.69	0.103	0.22
Spouse in part-time work	–0.345	–0.24	0.452	1.06
Increase labour supply spouse	0.175	0.36	–0.087	–0.28
Decrease labour supply spouse	–0.396	–0.30	—	—
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	–0.238	–0.42	0.459	1.39
benefits$_{-1}$ * part-time work$_{-1}$	—	—	0.285	0.77
benefits$_{-1}$ * absent from labour force$_{-1}$	–0.410	–0.55	0.265	0.56
chinc *absent from labour force$_{-1}$	–0.444	–0.38	—	—
chinc *employed$_{-1}$	–0.346	–0.01	—	—
chbre * absent from labour force$_{-1}$	–0.665	–0.55	—	—
chbre * employed$_{-1}$	0.482	0.03	–0.153	–0.30
correlation coefficient	0.237	0.89	. .	. .
number of observations	1220	. .	. .	. .
log likelihood	–591.31	. .	. .	. .
restricted log likelihood	–1017.64	. .	. .	. .

MULTINOMIAL LOGIT MODEL OF FEMALE UNEMPLOYMENT, PART-TIME AND FULL-TIME WORK FOR JOBSEEKERS

	P(part time)		*P(full time)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–0.608	–0.56	0.675	0.60
Personal characteristics				
Age/10	0.801	1.41	0.820	1.32
Age squared/100	–0.162	–2.05	–0.250	–2.81
Disabled	–0.115	–0.40	0.315	1.08
Disability which impedes employment	–0.391	–1.19	–0.865	–2.45
Skilled/unskilled vocational or finished secondary school	0.108	0.62	–0.085	–0.44
Degree or diploma	0.352	1.28	0.432	1.48
Received training in last year	0.558	3.13	1.062	5.69
Non-English background speaker	–0.719	–2.11	–0.135	–0.40
Immigrated after 1984	–0.412	–1.12	–0.397	–1.07
English proficiency less than good	0.117	0.27	0.454	1.05
Household characteristics				
Number of children	–0.012	–0.09	–0.054	–0.33
Age youngest child 0–5	0.349	1.03	–0.780	–1.97
Age youngest child 6–12	0.036	0.11	–1.214	–3.04
Newborn	–0.639	–1.07	–1.553	–1.39
Single	–0.535	–2.20	0.114	0.41
Sharing with others	–0.790	–2.56	–0.197	–0.61
Geographical location				
Urban centre (not capital city)	–0.192	–0.97	–0.412	–1.85
Rural area	0.356	1.41	0.114	0.40
Victoria	0.603	2.40	0.845	3.17
Queensland	0.589	2.26	0.732	2.59
South Australia	0.908	3.22	0.477	1.48
Western Australia	0.625	2.02	0.461	1.36
Tasmania	0.382	1.13	0.905	2.54
Australian Capital Territory	0.632	1.24	0.565	1.03
Work history				
No. of years in paid work/10	0.354	2.20	0.617	3.24
Unemployment$_{-1}$	–0.968	–2.94	–1.502	–5.06
Part-time work$_{-1}$	0.973	2.61	–0.374	–1.03
Out of the labour force$_{-1}$	–0.553	–1.26	–1.745	–3.42
Self employed$_{-1}$	–0.012	–0.02	–1.006	–1.12
Log (business/property income)/10	0.153	0.77	0.212	0.99
Benefits$_{-1}$	–0.626	–0.95	–1.142	–1.88
(De facto) spouse				
Benefit receipt of spouse	–0.445	–0.90	–0.102	–0.15
Change in benefit receipt of spouse (=chbre)	–0.300	–0.72	–0.537	–1.15
Change in income of spouse + own business/property income/1000 (=chinc)	0.146	0.62	0.154	0.44
Spouse absent from labour force	0.298	0.51	–0.870	–0.98
Spouse unemployed	–0.545	–0.97	–0.921	–1.20
Spouse part time	0.465	0.86	–0.798	–1.02
Increase labour supply spouse	–0.540	–1.31	0.229	0.51
Decrease labour supply spouse	–0.106	–0.25	–0.215	–0.41
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	0.479	0.69	0.038	0.06
benefits$_{-1}$ * part-time work$_{-1}$	0.311	0.41	–0.709	–0.90
benefits$_{-1}$ * out of the labour force$_{-1}$	0.357	0.42	1.299	1.44
chinc *(absent from labour force)$_{-1}$	–1.961	–1.90	–1.659	–1.29
chinc *employed$_{-1}$	–0.357	–0.49	–1.193	–1.54
chbre * (absent from labour force)$_{-1}$	–1.516	–1.84	–0.483	–0.43
chbre * employed$_{-1}$	0.066	0.08	0.507	0.54
number of observations	1161	. .	. .	. .
log likelihood	–976.89	. .	. .	. .
restricted log likelihood	–1264.71	. .	. .	. .

BIVARIATE PROBIT MODEL OF FEMALE UNEMPLOYMENT AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(unemployed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–0.134	–0.27	–1.888	–4.86
Personal characteristics				
Age/10	–0.574	–1.97	—	—
Age squared/100	0.125	2.93	—	—
Disability which impedes employment	0.330	2.77	0.244	1.58
Skilled/unskilled vocational or finished secondary school	–0.030	–0.30	0.071	0.59
Degree or diploma	–0.240	–1.62	–0.466	–2.38
Received training in last year	–0.430	–4.55	–0.347	–3.10
English proficiency less than good	—	—	–0.208	–0.79
Non-English background speaker	0.185	1.18	0.299	1.42
Immigrated after 1984	0.213	1.15	—	—
Household characteristics				
Number of children	0.043	0.85	0.122	1.84
Newborn	0.401	0.84	0.481	0.66
Age youngest child 0–5	—	—	0.166	0.89
Single	—	—	1.383	2.71
Sharing with others	—	—	1.050	2.09
Geographical location				
Urban centre (not capital city)	0.169	1.54	0.085	0.62
Rural area	–0.126	–0.91	–0.217	–1.18
Victoria	–0.408	–3.08	0.110	0.71
Queensland	–0.434	–3.05	0.004	0.02
South Australia	–0.422	–2.78	–0.189	–1.01
Western Australia	–0.367	–2.10	–0.222	–0.99
Tasmania	–0.357	–1.86	–0.305	–1.25
Australian Capital Territory	–0.323	–1.16	–0.085	–0.20
Work history				
No. of years in paid work/10	–0.259	–2.88	–0.069	–0.91
Unemployment$_{-1}$	0.846	4.78	–0.342	–1.64
Part-time work$_{-1}$	–0.086	–0.42	–0.429	–1.83
Out of the labour force$_{-1}$	0.715	2.74	–0.156	–0.49
Self employed$_{-1}$	0.300	0.65	0.022	0.02
Benefits$_{-1}$	0.717	2.05	1.474	4.21
Log (business/property income)/10	–0.081	–0.75	–0.121	–0.73
(De facto) spouse				
Benefit receipt of spouse	—	—	0.226	0.88
Change in benefit receipt of spouse (=chbre)	0.050	0.15	0.567	1.16
Change in income of spouse + own business/property income/1000 (=chinc)	0.242	1.02	–0.244	–0.85
Spouse absent from labour force	–0.071	–0.46	0.389	0.86
Spouse unemployed	–0.069	–0.18	0.187	0.35
Spouse part time	0.385	1.11	0.250	0.50
Decrease labour supply spouse	–0.107	–0.31	0.446	0.96
Increase labour supply spouse	0.049	0.18	–0.060	–0.19
Interaction variables				
chinc *(absent from labour force)$_{-1}$	1.187	2.05	—	—
chinc *employed$_{-1}$	0.326	0.62	—	—
chbre * (absent from labour force)$_{-1}$	0.688	1.17	0.204	0.27
chbre * employed$_{-1}$	–0.235	–0.54	—	—
benefits$_{-1}$ * unemployment$_{-1}$	–0.312	–0.85	0.663	1.71
benefits$_{-1}$ * part-time work$_{-1}$	–0.229	–0.56	0.509	1.22
benefits$_{-1}$ * absent from labour force$_{-1}$	–0.616	–1.32	0.311	0.55
Newborn *employed$_{-1}$	—	—	1.329	1.53
Newborn *(absent from labour force)$_{-1}$	—	—	0.481	0.48
Correlation coefficient	0.603	11.63	. .	. .
number of observations	1161	. .	. .	. .
log likelihood	–961.13	. .	. .	. .
restricted log likelihood	–1439.09	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE LABOUR FORCE PARTICIPATION AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(labour force absent)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–2.834	–3.72	–1.102	–2.55
Personal characteristics				
Age/10	–0.054	–0.16	–0.608	–2.92
Age squared/100	0.083	1.90	0.132	4.42
Disabled	–0.164	–0.59	—	—
Disability which impedes employment	0.929	3.40	0.363	4.25
Skilled/unskilled vocational or finished secondary school	0.007	0.06	–0.115	–1.48
Degree or diploma	–0.163	–0.76	–0.248	–1.85
Received training in last year	–0.140	–1.05	–0.235	–3.01
Non-English background speaker	–0.246	–0.98	–0.104	–0.75
Immigrated after 1984	–0.258	–0.83	–0.038	–0.23
English proficiency less than good	0.193	0.64	0.038	0.21
Household characteristics				
Number of children	0.123	0.97	0.078	1.42
Number of children$_{-1}$	–0.164	–1.29	—	—
Employed$_{-1}$ *no. of children$_{-1}$	0.055	0.31	—	—
Age youngest child 0–5	–0.144	–0.51	–0.189	–1.10
Age youngest child 6–12	–0.118	–0.40	–0.284	–1.67
Newborn	–0.644	–1.02	–0.454	–1.78
Single	0.658	1.04	1.196	4.56
Sharing with others	0.505	0.79	0.917	3.53
Geographical location				
Urban centre (not capital city)	0.010	0.08	0.056	0.63
Rural area	–0.196	–1.10	0.122	1.08
Victoria	0.055	0.31	–0.056	–0.49
Queensland & Northern Territory	–0.088	–0.47	–0.098	–0.82
South Australia	0.137	0.73	0.116	0.90
Western Australia	0.035	0.18	–0.185	–1.33
Tasmania	0.112	0.53	–0.138	–1.00
Australian Capital Territory	–0.247	–0.61	0.151	0.61
Work history				
No. of years in paid work/10	–0.403	–3.19	–0.229	–2.50
Unemployment$_{-1}$	0.745	2.99	–0.028	–0.22
Part-time work$_{-1}$	–0.180	–0.34	–0.010	–0.07
Out of the labour force$_{-1}$	1.993	6.44	0.027	0.12
Self employed$_{-1}$	0.240	0.58	0.050	0.24
Benefits$_{-1}$	0.337	0.89	1.069	7.43
(De facto) spouse				
Log (business/property income)/10	0.128	0.42	0.031	0.20
Benefit receipt of spouse	0.598	1.48	0.699	2.52
Change in income of spouse/1000 (=chinc)	0.028	0.27	–0.002	–0.02
Change in benefit receipt of spouse (=chbre)	–0.296	–1.28	0.143	0.87
Spouse is absent from labour force	0.025	0.06	0.432	1.82
Spouse is unemployed	–0.662	–1.34	0.271	1.10
Spouse is in part time	–0.075	–0.17	0.111	0.47
Increase labour supply spouse	–0.339	–1.04	–0.055	–0.26
Decrease labour supply spouse	0.785	2.84	0.397	1.62

...continued

BIVARIATE PROBIT MODEL OF MALE LABOUR FORCE PARTICIPATION AND BENEFIT RECEIPT FOR JOBSEEKERS—*continued*

	P(labour force absent)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	–0.783	–1.97	0.418	2.42
benefits$_{-1}$ * part-time work$_{-1}$	0.301	0.43	—	—
benefits$_{-1}$ * absent from labour force$_{-1}$	–0.566	–1.18	0.655	1.92
chinc *(absent from labour force)$_{-1}$	2.288	1.40	4.047	1.54
chinc *employed$_{-1}$	2.046	0.96	1.146	1.41
chbre * (absent from labour force)$_{-1}$	—	—	–0.671	–0.90
chbre * employed$_{-1}$	0.221	0.33	0.333	0.98
Newborn *(absent from labour force)$_{-1}$	0.183	0.21	—	—
Newborn *employed$_{-1}$	—	—	0.781	1.76
Correlation coefficient	0.337	4.6	. .	. .
number of observations	1883	. .	. .	. .
log likelihood	–1323.32	. .	. .	. .
restricted log likelihood	–1892.17	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE SELF EMPLOYMENT AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(self employed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–6.012	–5.64	–0.998	–2.17
Personal characteristics				
Age/10	2.134	3.73	–0.670	–2.95
Age squared/100	–0.259	–3.35	0.141	4.38
Disabled	0.070	0.23	–0.040	–0.28
Disability which impedes employment	–0.227	–0.65	0.374	2.35
Skilled/unskilled vocational or finished secondary school	0.065	0.37	–0.097	–1.16
Degree or diploma	0.029	0.11	–0.304	–2.10
Received training in last year	–0.075	–0.45	–0.221	–2.68
Non-English background speaker	—	—	–0.097	–0.63
Immigrated after 1984	0.479	1.98	–0.049	–0.29
English proficiency less than good	—	—	0.125	0.64
Household characteristics				
Number of children	–0.048	–0.37	0.069	1.20
Age youngest child 0–5	0.340	0.85	–0.221	–1.19
Age youngest child 6–12	0.149	0.39	–0.333	–1.84
Newborn	—	—	–0.418	–1.64
Single	–0.624	–1.45	1.154	4.14
Sharing with others	–0.647	–1.54	0.906	3.29
Geographical location				
Urban centre (not capital city)	0.015	0.08	0.054	0.57
Rural area	0.149	0.60	0.189	1.55
Victoria	0.169	0.70	–0.040	–0.33
Queensland & Northern Territory	0.252	1.05	–0.112	–0.88
South Australia	0.239	0.89	0.162	1.19
Western Australia	–0.071	–0.25	–0.183	–1.24
Tasmania	–0.288	–0.76	–0.126	–0.87
Australian Capital Territory	0.695	1.75	0.138	0.51
Work history				
No. of years in paid work/10	—	—	–0.252	–2.50
Unemployment$_{-1}$	0.527	2.01	–0.152	–1.13
Part-time work$_{-1}$	0.453	1.13	–0.057	–0.27
Out of the labour force$_{-1}$	0.709	1.56	0.222	0.70
Self employed$_{-1}$	2.532	8.23	0.046	0.19
Benefits$_{-1}$	0.144	0.40	1.011	5.36
(De facto) spouse				
Log (income of spouse)/10	–0.208	–1.14	0.038	0.23
Benefit receipt of spouse	—	—	0.596	2.02
Change in income of spouse/1000 (=chinc)	0.067	0.15	–0.007	–0.08
Change in benefit receipt of spouse (=chbre)	0.040	0.14	0.208	1.22
Spouse absent from labour force	–0.638	–2.06	0.527	2.00
Spouse unemployed	–0.459	–1.04	0.412	1.53
Spouse in part-time work	0.075	0.30	0.200	0.79
Increase labour supply spouse	0.231	0.80	0.030	0.13
Decrease labour supply spouse	–0.060	–0.13	0.307	1.13
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	–0.470	–1.13	0.592	2.72
benefits$_{-1}$ * part-time work$_{-1}$	–0.870	–1.07	0.115	0.38
benefits$_{-1}$ * out of the labour force$_{-1}$	–0.164	–0.22	0.252	0.52
chinc *out of the labour force$_{-1}$	—	—	4.748	1.47
chinc *employed$_{-1}$	0.735	0.78	0.836	1.06
chbre * out of the from labour force$_{-1}$	–1.128	–1.20	—	—
chbre * employed$_{-1}$	0.225	0.40	0.306	0.89
Newborn *employed$_{-1}$	—	—	0.765	1.73
Correlation coefficient	–0.157	–1.2	. .	. .
number of observations	1684	. .	. .	. .
log likelihood	–1051.65	. .	. .	. .
restricted log likelihood	–1547.72	. .	. .	. .

MULTINOMIAL LOGIT MODEL OF MALE UNEMPLOYMENT, PART-TIME AND FULL-TIME WORK JOBSEEKERS

	P(part time)		*P(full time)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	1.187	1.09	1.061	1.34
Personal characteristics				
Age/10	–0.773	–1.44	0.923	2.25
Age squared/100	0.067	0.89	–0.278	–4.60
Disabled	–0.868	–2.21	–0.267	–1.17
Disability which impedes employment	0.571	1.37	–0.666	–2.45
Skilled/unskilled vocational or finished secondary school	0.234	1.22	0.201	1.42
Degree or diploma	0.233	0.70	0.604	2.49
Received training in last year	0.312	1.61	0.591	4.12
Non-English background speaker	0.590	1.81	0.539	2.03
Immigrated after 1984	–0.079	–0.20	0.098	0.33
English proficiency less than good	–0.957	–2.23	–0.814	–2.40
Household characteristics				
Number of children	–0.054	–0.37	0.059	0.57
Age youngest child 0–5	0.350	0.79	0.155	0.47
Age youngest child 6–12	0.552	1.32	0.526	1.69
Newborn	–0.287	–0.42	–0.081	–0.17
Single	–1.165	–1.50	–1.707	–3.03
Sharing with others	–1.405	–1.80	–1.296	–2.32
Geographical location				
Urban centre (not capital city)	–0.300	–1.34	–0.341	–2.07
Rural area	–0.263	–0.97	–0.286	–1.40
Victoria	0.041	0.15	0.190	0.95
Queensland	0.012	0.04	0.123	0.56
South Australia	–0.073	–0.24	–0.287	–1.22
Western Australia	0.012	0.04	0.295	1.22
Tasmania	–0.109	–0.30	0.445	1.73
Australian Capital Territory	–1.339	–1.98	–0.554	–1.28
Work history				
No. of years in paid work/10	0.194	0.76	0.864	4.27
Unemployment$_{-1}$	–1.151	–3.30	–1.384	–6.59
Part-time work$_{-1}$	0.914	2.21	–0.630	–1.93
Out of the labour force$_{-1}$	–1.710	–1.54	–1.596	–3.10
Self employed$_{-1}$	0.539	0.75	–0.761	–1.34
Benefits$_{-1}$	–1.417	–2.09	–1.310	–3.85
(De facto) spouse				
Log (income of spouse)/10	–0.518	–1.38	–0.514	–2.00
Benefit receipt of spouse	0.898	1.54	–0.263	–0.63
Change in income of spouse + own business/property income/1000 (=chinc)	–0.494	–1.33	–0.778	–2.90
Spouse absent from labour force	0.009	0.04	–0.060	–0.48
Spouse unemployed	–1.125	–1.95	–0.364	–0.83
Spouse part-time	–1.110	–1.76	–0.397	–0.82
Increase labour supply spouse	–0.376	–0.71	–0.060	–0.15
Decrease labour supply spouse	–0.079	–0.16	0.444	1.18
Interaction variables				
benefits$_{-1}$ * unemployment$_{-1}$	1.590	2.19	0.008	0.02
benefits$_{-1}$ * part-time work$_{-1}$	1.480	1.86	0.546	1.03
benefits$_{-1}$ * out of the labour force$_{-1}$	1.783	1.18	–0.330	–0.37
chinc *(absent from labour force)$_{-1}$	–0.589	–0.10	–3.580	–1.12
chinc *employed$_{-1}$	0.397	0.41	0.087	0.19
chbre * (absent from labour force)$_{-1}$	–0.365	–0.13	1.093	0.57
Newborn *employed$_{-1}$	–1.122	–0.86	–0.288	–0.32
number of observations	1569	. .	. .	. .
log likelihood	–1194.95	. .	. .	. .
restricted log likelihood	–1515.58	. .	. .	. .

BIVARIATE PROBIT MODEL OF MALE UNEMPLOYMENT AND BENEFIT RECEIPT FOR JOBSEEKERS

	P(unemployed)		*P(receiving a benefit)*	
	coefficient	*t-ratio*	*coefficient*	*t-ratio*
Constant	–1.285	–2.90	–1.412	–2.91
Personal characteristics				
Age/10	–0.155	–0.71	–0.474	–2.03
Age squared/100	0.087	2.81	0.120	3.62
Disabled	0.230	1.82	—	—
Disability which impedes employment	0.166	1.11	0.372	3.81
Skilled/unskilled vocational or finished secondary school	–0.132	–1.67	–0.082	–0.96
Degree or diploma	–0.312	–2.20	–0.306	–2.03
Received training in last year	–0.297	–3.63	–0.238	–2.79
Non-English background speaker	–0.338	–2.20	–0.077	–0.51
English proficiency less than good	0.526	2.86	0.120	0.60
Household characteristics				
Number of children	–0.015	–0.26	0.096	1.54
Age youngest child 0–5	–0.069	–0.38	–0.302	–1.54
Age youngest child 6–12	–0.257	–1.50	–0.435	–2.26
Newborn	0.080	0.33	–0.328	–1.26
Single	0.907	3.09	1.091	4.13
Sharing with others	0.783	2.70	0.870	3.32
Geographical location				
Urban centre (not capital city)	0.196	2.13	0.080	0.81
Rural area	0.166	1.40	0.171	1.32
Victoria	–0.086	–0.75	–0.047	–0.38
Queensland	–0.043	–0.35	–0.053	–0.40
South Australia	0.132	1.00	0.187	1.34
Western Australia	–0.139	–1.01	–0.205	–1.37
Tasmania	–0.146	–1.00	–0.149	–0.99
Australian Capital Territory	0.468	1.69	0.116	0.42
Work history				
No. of years in paid work/10	–0.375	–3.57	–0.271	–2.55
Unemployment$_{-1}$	0.842	6.40	–0.081	–0.57
Part-time work$_{-1}$	0.230	1.24	–0.043	–0.18
Out of the labour force$_{-1}$	1.003	3.16	0.385	1.59
Self employed$_{-1}$	0.341	0.92	–0.642	–1.16
Benefits$_{-1}$	0.791	3.81	1.058	5.58
(De facto) spouse				
Log (income of spouse)/10	0.290	2.19	—	—
Benefit receipt of spouse	–0.062	–0.26	0.477	1.91
Change in benefit receipt spouse (=chbre)	0.372	2.51	0.282	1.69
Change in income of spouse + own business/property income/1000 (=chinc)	0.027	0.33	–0.041	–0.50
Spouse absent from labour force	0.313	1.22	0.611	2.16
Spouse unemployed	0.335	1.19	0.484	1.67
Spouse part-time	0.073	0.32	0.305	1.09
Decrease labour supply spouse	0.307	1.28	0.390	1.43
Increase labour supply spouse	–0.217	–0.98	0.196	0.75
Interaction variables				
chinc *(absent from labour force)$_{-1}$	1.921	1.22	3.132	0.90
chinc *employed$_{-1}$	—	—	0.424	0.56
chbre * (absent from labour force)$_{-1}$	–0.503	–0.48	—	—
chbre *(employed)$_{-1}$	—	—	0.312	0.99
benefits$_{-1}$ * unemployment$_{-1}$	–0.223	–0.97	0.533	2.44
benefits$_{-1}$ * part-time work$_{-1}$	–0.557	–1.88	0.091	0.28
benefits$_{-1}$ * out of the labour force$_{-1}$	–0.109	–0.25	—	—
Newborn *employed$_{-1}$	0.213	0.47	0.707	1.55
Correlation coefficient	0.668	20.10	. .	. .
number of observations	1569	. .	. .	. .
log likelihood	–1480.42	. .	. .	. .
restricted log likelihood	–1917.34	. .	. .	. .